BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of:

REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY TAMPA ELECTRIC COMPANY.	DOCKET NO. 070297-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY PROGRESS ENERGY FLORIDA, INC.	DOCKET NO. 070298-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY GULF POWER COMPANY.	DOCKET NO. 070299-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY FLORIDA POWER & LIGHT COMPANY.	DOCKET NO. 070301-EI

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BEFORE:	CHAIRMAN LISA POLAK EDGAR COMMISSIONER MATTHEW M. CARTER, II COMMISSIONER KATRINA J. McMURRIAN COMMISSIONER NANCY ARGENZIANO COMMISSIONER NATHAN A. SKOP
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APPEARANCES:	(As heretofore noted.)

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CHAIRMAN EDGAR: We will go back on the record. And, Mr. Willis, before I call upon you, let me ask our staff if there are any other preliminary matters that we need to go ahead and address.

MS. FLEMING: Yes. Staff would like to note that it was pointed out to us in staff composite Exhibit 6, Tab 3, FCTA's response to staff's first set of interrogatories, only the certificate of service was included in that stack. During the break staff has added in the actual responses. And I've checked all the parties' piles and I think they're all in there. If anybody is missing a copy, please let us know. We have extras.

CHAIRMAN EDGAR: Thank you. Any other matters? No.

Okay. Mr. Willis.

MR. WILLIS: I am pleased to report, Madam Chairman, that we have reached an agreement with FCTA. As a part of that agreement, as I understand it, we would like to strike the testimony of Mr. Harrelson in this docket, and we will also withdraw the rebuttal testimony of Regan Haines.

And Tampa Electric will clarify its position with respect to Issue 12 as follows: Tampa Electric agrees, and hereby clarifies that its position on Issue 12, that Tampa Electric is not seeking approval of the Florida Public Service

Commission (FPSC) of its attachment standards and procedures for third-party attachments beyond a finding that Tampa Electric has attachment standards and procedures for third-party attachments that meet or exceed the NESC." With that, I also want to express my deep appreciation for your indulgence in allowing us the time to complete this agreement.

CHAIRMAN EDGAR: Thank you. And before I call upon the FCTA representatives, do you per chance have an extra copy of that for the court reporter, the written statement that you just read on the issue restatement?

MR. WILLIS: I don't, but I can give her, I can give it to her.

CHAIRMAN EDGAR: Would that be helpful? Okay. And FCTA.

MR. SEIVER: Thank you, Madam Chair. And we appreciate as well your indulgence. The work was diligent and hard, but it paid off. And for purposes of the record, we believe, and I don't know if the proper term is to withdraw rather Mr. Harrelson's testimony from the TECO docket, but we would also like to -- and I believe it's probably strike the cross-examination of Mr. Harrelson in the TECO docket, and we'd also like to strike the cross-examination of Mr. Haines in the TECO docket.

MR. WILLIS: I have no objection to that.

CHAIRMAN EDGAR: Okay. Okay. Ms. Fleming, I'll look

to you. I understand that, realizing that we have an agreement between the parties, the request to strike the cross of Witnesses Haines and Harrelson, is, is that where we need to be to have the record in order? Can you help walk me through it?

MS. FLEMING: Yes, Madam Chairman. That's correct.

CHAIRMAN EDGAR: Okay. So, again, for purposes of the record, the cross-examination testimony of Witnesses Haines and Harrelson will be struck. And the prefiled testimony that would have been entered into the record, does that need to be struck as well?

MS. FLEMING: It's already been entered into the record, so, yes, I would suggest it be struck. In essence FCTA is withdrawing that testimony; correct?

CHAIRMAN EDGAR: Is withdrawing. Okay. So the prefiled direct testimony of Witnesses Haines and Harrelson will be withdrawn from the record.

MR. SEIVER: Yes. In the, just in the TECO docket.

CHAIRMAN EDGAR: Thank you. Yes. Just in the TECO docket. Absolutely.

MS. FLEMING: And may I ask for clarification as far as Haines' testimony? Is it just the rebuttal that's being withdrawn or the direct?

MR. WILLIS: Just the rebuttal, yes.

MS. FLEMING: Just the rebuttal that's being withdrawn. Okay.

MR. WILLIS: We have his direct testimony as well as his exhibit, which is Exhibit 8, which I believe has been moved into the record would be part of the record.

CHAIRMAN EDGAR: I'm sorry. Mr. Willis, could you say that again?

MR. WILLIS: Mr. Haines' direct testimony and his exhibit, which was identified as Exhibit Number 8, would be, remain in the record.

CHAIRMAN EDGAR: Okay. All right. Are we clear? Is everybody clear? Everybody is clear. Everybody clear. Okay.

MS. BROWNE: Madam Chair, FCTA --

CHAIRMAN EDGAR: Yes, ma'am.

MS. BROWNE: FCTA would like to change its position too on two of the issues pertaining to TECO.

Issue 12, we would change from "No" to "No objection." And on Issue 13, we would also change that position from "No" to "No objection."

CHAIRMAN EDGAR: Okay. So for purposes of the record we will note that FCTA is changing its position on Issues 12 and 13 in the TECO docket from "No" to "No objection."

MS. BROWNE: Thank you, Madam Chair.

CHAIRMAN EDGAR: Thank you.

Any other matters related to this matter?

MS. FLEMING: The only other matter is the exhibits relating to Mr. Harrelson. As far as Exhibits 28, 29 and 30,

they will only be moved into the Progress docket, which is 070298, and the FPL docket, 070301. With respect to Exhibit --

CHAIRMAN EDGAR: I'm sorry, Ms. Fleming. Let me catch up. Okay. Exhibits 28, 29 and 30 we're proposing to move into the record for the Progress docket. What about the FPL docket?

MS. FLEMING: And the FPL docket.

CHAIRMAN EDGAR: And the FPL docket. Okay. And obviously not for the TECO docket.

MS. FLEMING: Not for the TECO or the Gulf because that testimony has been withdrawn.

CHAIRMAN EDGAR: Okay. Exhibits 28, 29 and 30 will be moved into the record for the Progress and FPL dockets.

(Exhibits 28, 29 and 30 marked for identification and admitted into the record.)

MS. FLEMING: Exhibit 31 will not be moved into the record because it's been withdrawn.

CHAIRMAN EDGAR: Yes.

MS. FLEMING: And Exhibits 32 and 33 will be moved into the FPL docket.

CHAIRMAN EDGAR: Okay. Seeing no questions or objections, Exhibits 32 and 33 will be moved into the record for the FPL docket.

(Exhibits 32 and 33 marked for identification and admitted into the record.)

Give me just a moment here to catch up with my notes.

Okay. And then we need to look at Exhibits 51 and 52. 51 to be withdrawn.

MR. WILLIS: It's a part of the composite exhibit and so we'd just leave it for identification only.

CHAIRMAN EDGAR: Leave it as identified for 51 but not to be entered into the record; is that correct?

MR. WILLIS: Right. It's already in the record.

CHAIRMAN EDGAR: Oh, it is in the record.

MR. WILLIS: Right. It's part of the staff's composite.

CHAIRMAN EDGAR: Ms. Fleming.

MS. FLEMING: I would disagree. I don't believe it's part -- it's my understanding that Exhibit 51 is TECO's response to FCTA's first set of PODs. Staff only included FCTA's responses to staff's interrogatories.

MR. WILLIS: It can be withdrawn in any event because of the --

CHAIRMAN EDGAR: Because of the agreement.

MR. WILLIS: -- the agreement.

MS. BROWNE: FCTA has no objection. And we have one other issue to change our position on.

CHAIRMAN EDGAR: Okay. So Exhibit 51 will be withdrawn. Let's go ahead and take up exhibit -- did I say exhibit? I hope I said exhibit. Exhibit 51 will be withdrawn.

Exhibit 52, the errata sheet, we need to enter into the record for the Progress and FPL dockets.

MS. FLEMING: That's correct, Madam Chairman.

CHAIRMAN EDGAR: Okay. Seeing no objection, Exhibit 52 will be entered into the record for Progress and FPL dockets. And then you said an issue statement.

(Exhibit 52 marked for identification and admitted into the record.)

MS. BROWNE: Yes. FCTA would like to change its position on TECO Issue Number 7 to "No objection."

CHAIRMAN EDGAR: Okay. In the TECO docket, FCTA's position on Issue Number 7 will be changed for the record from "No" to "No objection."

MS. BROWNE: Thank you, Madam Chair.

CHAIRMAN EDGAR: Okay. Any other items related to this matter? Seeing none. Okay. Are we ready to move on to rebuttal testimony? We are.

Okay. And as we have just discussed, we will not be taking up Witness Haines, so I believe that brings us to Witness Battaglia.

MR. BADDERS: Yes, ma'am, it does.

We're ready to proceed.

EDWARD J. BATTAGLIA

was recalled as a witness on behalf of Gulf Power Company and, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. BADDERS:

Q Please state your name and address for the record.

A My name is Edward J. Battaglia. My business address is 1 Energy Place, Pensacola, Florida 32520.

Q And were you present this morning or yesterday morning when the witnesses were sworn in?

A I was.

Q And you took the oath?

A Yes.

Q By whom are you employed?

A Gulf Power Company.

Q Have you prefiled rebuttal testimony consisting of 12 pages in this docket?

A Yes.

Q Do you have any changes or corrections to that testimony?

A No.

Q If I were to ask you the same questions today, would your answers be the same?

A Yes.

MR. BADDERS: We ask that the prefiled rebuttal testimony of Mr. Battaglia be inserted into the record as though read.

CHAIRMAN EDGAR: The prefiled rebuttal testimony will

be inserted into the record as though read.

MR. BADDERS: Thank you.

BY MR. BADDERS:

Q Mr. Battaglia, do you also have one exhibit attached to your testimony?

A Yes.

Q Do you have any changes to that exhibit?

A No.

MR. BADDERS: His exhibit has already been identified as Exhibit Number 39.

(Exhibit 39 marked for identification.)

GULF POWER COMPANY

Before the Florida Public Service Commission
Rebuttal Testimony of
Edward J. Battaglia
Docket No. 070299-EI
In Support of Gulf Power Company's Storm Hardening Plan
Date of Filing: September 14, 2007

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

A. My name is Edward J. Battaglia, and my business address is One Energy Place, Pensacola, Florida 32520. I am the Technical Services Manager for Gulf Power Company. My organization is responsible for providing technical support for the distribution engineering and construction personnel at Gulf. This technical support function includes the Company's Reliability, Design and Construction Specifications, Power Quality, Distribution Geographic Information System (DistGIS), Technical Applications, such as the Company's Job Estimating and Tracking System, and large project engineering.

Q. Are you the same Edward J. Battaglia who provided direct testimony on Gulf Power's behalf in this docket?

A. Yes.

Q. Have you prepared an exhibit that contains information to which you will refer in your testimony?

A. Yes. I have one exhibit consisting of nine schedules to which I will refer. These schedules were prepared under my supervision and direction.

Counsel: We ask that Mr. Battaglia's Exhibit EJB-2, consisting of nine schedules, be marked for identification as Exhibit No. ___.

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

A. I will address the direct testimony of Mr. R. L. Willoughby and Mr. Peter J. Rant filed on behalf of the City of Panama City Beach, Florida and the City of Panama City Beach Community Redevelopment Agency concerning Gulf Power Company's Storm Hardening Plan (the "Plan") for the period 2007 through 2009 as amended on August 14, 2007. Specifically, I will address how their analysis and assumptions are flawed in asserting that undergrounding can be applied in a blanket fashion as a "meaningful tool for storm hardening, a tool that can greatly reduce restoration costs and that can greatly improve reliability in a storm situation."

Q. Do you agree with Mr. Willoughby and Mr. Rant's conclusion that Gulf failed to consider undergrounding as a storm hardening activity?

A. No. As discussed in my direct testimony, Gulf adequately considered transitioning to underground as a storm hardening option in the development of its Plan. Gulf relied on its many years of storm restoration experience, both on Gulf's system and in helping other utilities, as well as

its experiences from Hurricanes Ivan and Dennis, to formulate a plan to meet the requirements of Rule 25-6.0341 and 25-6.0342, Florida Administrative Code.

While there is no empirical forensic data showing the exact storm impacts from Hurricanes Ivan and Dennis, field observations by Gulf personnel involved in the restoration effort after these hurricanes were used as an input for determining how to storm harden Gulf's system. Schedule 1 of my exhibit has several pictures showing some of the damage from hurricanes that impacted Gulf's system. Along with this base of knowledge, Gulf also incorporated its experience with day-to-day operation and maintenance of its electric system.

In adopting a storm hardening activity, Gulf considers both cost-effectiveness and whether the activity meets the goal of reduced customer outages and restoration times. In reviewing an activity for implementation, the Company looks at how the activity would further the goal of reduced customer outages and restoration times both in the aftermath of a storm occurrence and also on a day-to-day operations basis. At this time, Gulf's experience with underground distribution does not support wide spread use of undergrounding as a storm hardening activity. Although underground distribution appears to be an attractive method of avoiding wind damage during a storm event, underground construction has limitations that cause additional issues on a day-to-day operational basis and during storm restoration. For example, underground construction results in increased cost for initial installation, normal operation and maintenance and storm restoration situations. Finding and repairing

damage to underground facilities after a storm event and on a day-to-day basis takes longer resulting in longer outages. Mr. Rant apparently believes that all underground facilities are loop fed, which is simply not the case. If all new underground were loop fed, the cost of underground would be even greater. Even in the case of loop fed underground, it is still susceptible to storm surges and to damage during clean-up after storms. Undergrounding also presents challenges to the goal of facilitating safe and efficient access to facilities. Gulf's first hand experience is that padmounted equipment gets covered up both in the initial clearing of sand and debris from roads and in the piling of debris on road rights-of-way as customers work through the restoration process of their homes and businesses. This poses a major safety concern for both the public and for utility personnel operating, troubleshooting or repairing the equipment and adds time to the restoration process. In addition, padmounted equipment associated with underground facilities is subject to damage by the debris movers in the process of pushing and loading the debris onto trucks.

Q. Does this mean Gulf is opposed to further consideration of undergrounding as a potential future storm hardening activity?

A. No. Gulf is conducting several distribution projects to test their potential as storm hardening techniques. Gulf is piloting underground storm hardening techniques as discussed in its Plan and contained within Appendix 6 of the Plan. These are being done in potential storm surge areas to test the effectiveness of mitigation techniques. Some of these

are: continuing to use non-corrosive cabinets for equipment, below grade switch gear, and anchoring vaults with concrete filled pilings.

Q. Does Gulf have a process in place for collecting additional data on undergrounding as a storm hardening activity?

A. Yes. The process consists of O&M data collection and elements of the Ten-Part Storm Preparedness Plan initiatives (Ten-Part Initiatives). This includes the development of a Geographic Information System (GIS), post storm data collection and forensic analysis, the collection of outage data differentiating between overhead and underground systems, and participation in collaborative storm hardening research with other utilities through the Public Utility Research Center (PURC) at the University of Florida. In addition, the process includes the installation of Gulf's own wind monitors to provide the granular weather data needed to support the forensic data analysis.

Q. In their testimonies, Mr. Willoughby and Mr. Rant describe their experience with how underground fares in storm situations. Do you believe the underground situations they describe are comparable to circumstances existing in Northwest Florida?

A. No. Gulf has approximately 7,200 miles of distribution line with approximately 1,400 miles (20 percent) of the distribution system being underground; in contrast, Mr. Willoughby's experience is based on two small electric systems. Based on the web pages of the respective utilities, the City Of Washington, electric utility operation, has approximately

12,000 customers and 350 miles of line with approximately 10%-15% (35-53 miles) underground. The City of Kinston, electric utility operation, has approximately 12,400 customers and 450 miles of distribution. A table indicating this data is provided in Schedule 2 of my exhibit.

Mr. Rant's testimony indicates no first hand experience with the impact of storms on distribution facilities or storm restoration work. While employed by Brunswick Electric Membership Corporations, he worked on an overhead to underground conversion on barrier islands on the coast of North Carolina. Since the conversion, this system has been impacted by one tropical storm, Ernesto, which occurred in 2006. The National Weather Service shows that Ernesto made landfall at Oak Island, NC. The storm surge produced by Ernesto was about 3 feet at Wrightsville Beach which is approximately 40 miles from Oak Island. Ernesto did produce torrential rainfall and floods in eastern North Carolina. It appears the storm surge was not significant. There are immediate and long-term effect differences when pad mounted equipment is flooded by rainfall versus immersed in a saltwater bath. In addition, Northwest Florida is noted for its "sugar white" beaches. This sand is of a very fine nature which quickly erodes and is carried easily in a storm surge. A single tropical storm provides no real information about the benefits of undergrounding, though it appears this is the sole basis of Mr. Rant's conclusions on undergrounding as a storm hardening activity. As indicated in Schedule 1 of my exhibit, Gulf's experience with underground distribution facilities on barrier islands tells a much different story.

In addition, Mr. Willoughby and Mr. Rant do not discuss the differences in terrain, age of the system, storm intensity experienced, level of storm surge experienced, seawall protected areas versus those with no seawall, or proximity of beach waterline to facilities in coming to their conclusion that undergrounding is an effective storm hardening activity for Gulf.

Q. Mr. Willoughby discusses several named storms as a basis for his conclusions regarding undergrounding as a storm hardening activity. Do these storms provide a sound basis for comparison of storm impacts on Gulf's system?

A. No. Mr. Willoughby stated at page 6 of his testimony that "As City Manager of Washington, North Carolina from 1996 to 2003, I was head of Washington's city government when our electric utility system experienced 5 named storms. Hurricane Fran in 1996, Hurricane Bertha in 1996, Hurricane Bonnie in 1998, Hurricane Dennis in 1999, and Hurricane Floyd in 1999". Schedules 3, 4, 5, 6, and 7 of my exhibit are the National Weather Services storm reports for each of the above named storms. A summary of my research of these storms is as follows:

1. Hurricane Fran - 1996 - landfall near Cape Fear, NC - 159 miles from Washington, NC. Fran was a mid-level category 3 storm at landfall.

2. Hurricane Bertha - 1996 - landfall midway between Wrightsville and Topsail Beaches - 121 miles from Washington, NC. Bertha was a mid-level category 2 storm at landfall.

3. Hurricane Bonnie - 1998 - Landfall near Wilmington, NC - 121 miles from Washington, NC. Bonnie was a high category 2 storm at landfall.

4. Hurricane Dennis - 1999 - Landfall at Cape Lookout National Seashore, NC - 86 miles from Washington, NC. At landfall, Dennis was a strong tropical storm.

5. Hurricane Floyd - 1999 - Near Cape Fear, North Carolina - 159 miles from Washington, NC. Floyd was a mid-level category 2 storm at landfall.

Schedule 8 of my exhibit is a map with the North Carolina hurricane tracks for these storms and it shows the location of the City of Washington. Although the tracks of these storms, may have been in the vicinity of Washington, given this information, it does raise in my mind doubts as to the level of storm impact which would be experienced by the City of Washington upon which Mr. Willoughby is basing his judgment and recommendations on underground. Hurricane impacts can vary significantly, even those of the same category, in the level of wind damage and storm surge damage experienced depending upon how tight the high winds are to the eye of the storm and the tide level at landfall. Also, it is not only the force of the storm surge on objects such as homes and padmounted equipment which creates massive problems, but a storm surge off the Gulf of Mexico consists of a salt water sand slurry which infiltrates and fills everything in its path.

Q. Do you agree with Mr. Rant's analysis regarding the impacts of hurricanes on Gulf's distribution system?

A. No I do not. Mr. Rant's analysis is flawed in many respects. First, Mr. Rant bases his analysis on one storm, Hurricane Dennis in 2005. He states that the conditions experienced in Dennis were fairly comparable in Panama City Beach and in Pensacola. He goes on to say that "In fact, comparable detailed data for the two cities indicates that the storm conditions experienced in Panama City Beach were worse than in Pensacola." This is just not the case. As shown in Mr. Rant's exhibit PJR-2, the data in Table 3 of the National Hurricane Center's final report shows that Pensacola had wind observations as great as 71 knots sustained and gusts as high as 81 knots. This is shown on page 12 of the report. Additional wind data for Hurricane Dennis is shown in Schedule 9 of my exhibit. Gulf captured data from the National Weather Source, which shows a more detailed picture of the wind field from Hurricane Dennis and clearly shows Pensacola experiencing greater winds than Panama City Beach. In addition, to rely on Mr. Rants analysis to make sound engineering judgments in respect to underground and overhead, one must know where the overhead and underground facilities are located within each city, their vegetation conditions, their proximity to the Gulf, their elevations, the "granular" wind data, the details of the damage to the facilities, the causes of damage and other similar data. In other words, in order to do a fair and unbiased assessment of the merits of overhead and underground in respect to storm hardening options, one must do what Gulf has proposed in its Storm Hardening Plan. The analysis needed is far

more complicated than the analysis done by Mr. Rant. Gulf's plan is composed of establishing methodologies for collecting the needed metrics, including cost and engineering data. The engineering data involves the collection of daily outage data and storm outage data including the when, where and how, which can be fed into Gulf's GIS to be analyzed by Gulf's engineers. The Plan incorporates the Ten-Part Initiatives which will enable Gulf to do the level of analysis to better evaluate the undergrounding issue. This includes GIS development, a post storm data collection and forensic analysis, the collection of outage data differentiating between overhead and underground systems, and participation in collaborative storm hardening research with other utilities through PURC at the University of Florida. In addition, it involves the installation of Gulf's own wind monitors to provide the granular weather data needed to support the forensic data analysis. Gulf maintains that the analysis which Mr. Willoughby and Mr. Rant speak of in their testimony is already underway through these initiatives. In fact, collaborative research through PURC has already produced a preliminary draft report and the final report is due March 30, 2008. In summary, the measurements used by Mr. Rant to form his opinion do not make a strong or compelling endorsement of undergrounding as a storm hardening option.

Q. In Mr. Rant's testimony, he uses data provided by Gulf to form the opinion that underground facilities fare much better than overhead facilities. Do you agree with his analysis?

A. No I do not. Again Mr. Rant's analysis has many flaws. He forms an

opinion that reliability for Gulf's customers in Panama City Beach (PCB) is better than Pensacola's because PCB has a higher percentage of underground distribution. Mr. Rant's conclusion is incorrect. First, comparing Pensacola and PCB is not an "apples to apples" comparison. There are many factors which make this type of comparison difficult, if not impossible, including the age of facilities, vegetation, yearly storm patterns in terms of wind, rain and lightning, geographic differences, vehicle volume and traffic flows, and construction activity.

In response to Mr. Rant's discussion of CAIDI (Customer Average Interruption Duration Index) data, his logic is not supported by the facts. In order to evaluate this issue, it is more appropriate to look at the data for overhead and underground within the same city. Such an analysis shows that for any of the three cities, for any year, CAIDI is always much higher for underground than overhead. Longer duration outages is an inherent characteristic with underground, it is what you would expect, even with using the latest underground technology.

Q. Is it Gulf's position that undergrounding is definitely not a storm hardening option?

A. No, it is possible. Gulf is very concerned with the cost ramifications and associated impact to its customers. If Gulf were to replace the overhead system with underground in just three cities in the Company's service area, Pensacola, Fort Walton Beach and Panama City Beach, the cost is estimated to be $780 million. This cost estimate is approximately 150% higher than the amount of Gulf's total system net distribution investment at

the end of 2006. Gulf asserts that it is inappropriate to take an issue as complex as this one and make a decision based on just a few assumptions. Proper analysis requires in-depth study based on factual data to ensure that we do not simply trade off one set of problems for another and that there is indeed value to all of our customers. As previously discussed, Gulf's Plan incorporates the Ten-Part Initiatives which will enable Gulf to do the level of analysis to better evaluate the undergrounding issue.

Q. Does this conclude your rebuttal testimony?

A. Yes.

BY MR. BADDERS:

Q And at this time, Mr. Battaglia, would you please summarize your testimony.

A Certainly. Good afternoon, Commissioners.

Gulf Power is very concerned with the possible cost ramifications and associated impact to its customers if underground construction is adopted as a storm hardening option. If Gulf were to replace the overhead system with underground in just three cities in the company's service area, Pensacola, Fort Walton Beach and Panama City Beach, the cost is estimated to be $780 million. This cost estimate is approximately 150 percent higher than the amount of Gulf's total system net distribution investment at the end of 2006.

In the development of Gulf's Storm Hardening Plan, transitioning to underground was considered as a storm hardening option. Although underground distribution appears to be an attractive method of avoiding wind damage during a storm event, underground construction has limitations that cause additional issues on a day-to-day operational basis and during storm restoration.

Finding and repairing damage to underground facilities after a storm event and on a day-to-day basis takes longer, resulting in longer outages. O&M costs are higher for underground. Finally, underground is susceptible to storm surges and to damage during cleanup after storms.

Data comes in various forms. In respect to the saying "A picture is worth a thousand words," Gulf's Schedule 1 is a pictorial summary of Gulf's first-hand experience with the impact of storm surges. Gulf's experience with underground construction on both a day-to-day operational basis and during recent storm restoration associated with Hurricanes Ivan and Dennis resulted in the decision to not adopt underground as a storm hardening activity at this time.

In respect to Hurricane Dennis, which is used as a basis of Mr. Rant's study in his testimony, the National Weather Service data shows that the storm made landfall on Santa Rosa Island, which is approximately 15 miles from Pensacola and approximately 80 miles from Panama City Beach. However, Gulf has not ruled out underground as a storm hardening option. Gulf continues to conduct several distribution pilot projects in potential storm surge areas to test the effectiveness of mitigation techniques and has joined the other IOUs through PURC and further studying underground as a possible storm hardening option. Gulf's proposed Storm Hardening Plan is proactive in pursuing underground as a possible storm hardening option in a sound engineering and cost-effective manner, thus insuring value to all of our customers.

In conclusion, this is Gulf's first Storm Hardening Plan pursuant to Florida Public Service Commission rule. As

data continues to be gathered and research progresses, Gulf will continue to evaluate and refine its approach to storm hardening in a way that balances storm hardening with the need to maintain reasonable costs to all of its customers and still achieve the expected results of reduced outages and restoration times.

This concludes my summary.

MR. BADDERS: We tender the witness for cross.

CHAIRMAN EDGAR: Thank you.

Mr. Wright.

MR. WRIGHT: Thank you, Madam Chairman.

CROSS EXAMINATION

BY MR. WRIGHT:

Q Good afternoon, Mr. Battaglia.

A Good afternoon.

Q My first question just follows up on a remark you made in your summary in which you said Gulf continues to conduct underground pilot projects. Can you tell us where those projects are?

A What I'm referring to when I say pilot projects, what I'm referring to is the mitigation techniques that we've developed as far as storm hardening for underground. The projects in which they are applied to are the ones that are customer driven, that -- again, I spoke about a few of them yesterday as far as scattered throughout our service territory.

Each opportunity where a customer chooses to, to convert overhead to underground, where it's applicable we are trying to go ahead and apply those mitigation techniques for storm hardening. And those together is what I'm referring to as far as pilot programs and to be able to test out those types of specifications.

Q Thank you. At Page 2 of your rebuttal testimony you assert that the City of Panama City Beach's witnesses, Mr. Willoughby and Mr. Rant, assert that undergrounding can be applied in a blanket fashion. Where in their testimony, where in Mr. Rant's testimony, if at all, do you see a statement that asserts that undergrounding can be applied in a blanket fashion?

A In reading their interpretation or reading their testimony, that was my viewpoint of where they were coming from in their overall testimony.

Q Did you see any assertion in there that it would be -- should be applied in a blanket fashion?

A No, I did not.

Q Okay.

A But I did see that they were in so many words saying that. In their analysis it was making a strong and compelling case for undergrounding.

Q Did you read Mr. Rant's testimony where he specifically stated that in his opinion underground is not,

undergrounding is not a panacea?

A Yes, I did.

Q Did you happen to review Mr. Rant's testimony where at Page 21 he testified that the real point of his testimony is that all the benefits and costs should be considered in evaluating undergrounding as a storm hardening measure?

A Yes, I did.

Q Okay. You didn't see anything in either Mr. Willoughby's or Mr. Rant's testimony to the effect that Gulf should underground its whole system, did you?

A No, I did not.

Q Thank you. I noticed in your exhibits, specifically EJB-2, Schedule 1, which is the batch of photographs -- I think you referred to those in your summary as well. I have a couple of questions about those. Were all of these photos taken in Gulf's service area?

A Yes, they were.

Q I think I noticed one of the photographs had a -- yeah. Page 7 of 10 indicates that it was from Hurricane Opal, which was about 12 years ago; is that correct?

A Yes, it is.

Q What other storm, storms are -- let me rephrase.

Are there other storms besides Opal that are reflected in these photographs, and, if so, what are they?

A As far as other storms reflected in these

photographs, I do not know.

Q Okay. Do you know who took these photographs?

A These photographs, I do not know exactly who took these photographs.

Q Okay. I did note that the, the picture of the impact of, from Hurricane Opal at Page 7 is pretty dramatic. Would I be correct that Gulf did not begin collecting any forensic data after Hurricane Opal struck your service area?

A In terms of forensic data as we now understand it, no.

Q To your knowledge did Gulf personnel take any pictures of overhead facilities that were damaged by any of the storms that have struck Gulf's service area in the last 12 years?

A Again, I, I do not know directly, but I would suspect that there were pictures taken of overhead facilities also.

Q Did you review any such photographs in your work preparing Gulf's Storm Hardening Plan?

A No, I did not review any photographs in preparing the Storm Hardening Plan mainly due to my first-hand experience with observing a lot of overhead after a major storm.

Q Thank you. I'd like now to turn to your rebuttal testimony addressing Mr. Rant's analysis of the outage information for Panama City Beach and Pensacola. And first I want to simply ask you, do you agree that the underground

mileage and overhead mileage values reported in Mr. Rant's testimony for the two cities are correct?

A Yes, I do.

Q And, in fact, didn't Mr. Rant correctly identify the fact that Gulf had inadvertently misreported its underground mileage for Panama City Beach in your interrogatory response?

A Yes, he did.

Q Thank you. And similarly you'll agree that the restoration information provided by Gulf for the two cities is correct, will you not?

A Yes, I would.

Q We're on Page 5 and -- well, I'm sorry. I'm on Page 5 just because that's where, that's where the page landed. But I did want to ask you a question about, about Gulf's own wind monitors that you refer to at Line 13 and 14 on Page 5.

A Yes, sir.

Q Has Gulf installed any of those wind monitors yet?

A To my knowledge, at this point we're in the process of installing the first one.

Q How many do you intend to install overall, if you know?

A I know throughout the service system there's going to probably be -- and again upon memory, at least a half a dozen, but I don't know the total off the top of my head.

Q Thank you. Now I'm on Page 9 which talks about

Panama City Beach and Pensacola. And you refer to what is Schedule 10 of your exhibit, your rebuttal exhibit, which I believe depicts a wind field map from the National Hurricane Center.

A Please repeat that.

Q I'm really just trying to get you to look at Schedule 9 of your rebuttal exhibit.

A Yes, sir.

Q And confirm that it, it represents a wind field map provided, what appears to be from an online source at the National Hurricane Center. Is that accurate so far?

A Yes, sir.

Q Okay. Do you know where the wind field data in that exhibit came from?

A The source of the wind field data from which that came from, I do not know exactly the source other than, again, this is from the National Hurricane Center.

Q Okay. I'd like to direct your attention to the black rectangular box contained within the map.

A Yes, sir.

Q And I believe -- it's not, it's not the clearest printing I've ever seen, but I believe that it says that, that this depicts wind force, force wind swaths of Dennis from advisories 1 through 26. Can you confirm to the Commission that that's what that says?

A That is correct.

Q So you would agree that the final National Hurricane Center Tropical Cyclone Report was published sometime after the advisories; correct?

A I would agree with that. But this is based on their predictions during those times.

Q Just asking you about the arithmetic of Mr. Rant's calculations based on Gulf's data. Do you agree that Panama City Beach has approximately 45 percent of its distribution lines underground?

A Based on the data provided and based on the fact that that calculation was made from the data, yes.

Q And similarly you'll agree that -- well, similarly will you agree that based on Gulf's data and Mr. Rant's calculations Pensacola has about 21 percent underground?

A That is correct.

Q Now I understood your testimony to say that there are other factors involved; is that accurate?

A Yes, sir.

Q Is it your intention to create the impression that the fact that Panama City Beach has more than double the underground facilities than Pensacola doesn't have anything to do with the fact, with the observed facts that Panama City Beach had much better hurricane experience in Dennis?

A Would you repeat that again, please?

Q Yeah. I apologize. That was not as artful a question as I would have wanted to ask.

You've agreed that Panama City Beach has more than double the percentage of underground facilities as Pensacola; correct?

A Correct, based on the calculations shown.

Q Is it your testimony that that fact doesn't have anything to do with the observed better restoration performance for Panama City Beach in Hurricane Dennis?

A And, again, I apologize, but repeat the question.

Q Is it your testimony that the fact that Panama City Beach has double the underground of Pensacola doesn't have anything to do with the observed facts that Panama City had lower outages and faster restoration?

MR. BADDERS: I'm going to have to object to the form of the question. I don't believe it's been established that it performed better.

BY MR. WRIGHT:

Q Do you happen to have a copy of Mr. Rant's testimony with you, Mr. Battaglia?

A Yes, sir.

Q Okay. And I am specifically referring to what has now been admitted into evidence in this docket as Exhibit 36. I am looking at Page 14 of 14 of that exhibit. Excuse me. I'm looking at Page 19 of 22 of the exhibit, which is Page 14 of 14

of Gulf's response to Panama City Beach's Interrogatory Number 17. Can you find that?

A I need a copy of it to be sure I'm making, I'm looking at the exact same thing. Thank you, sir.

Q Are we together now, Mr. Battaglia?

A Yes, sir.

Q Okay. The last box -- and you do recognize this as an interrogatory response provided by Gulf Power Company; correct?

A Yes, sir.

Q And the information contained in this interrogatory response is true and correct to the best of your knowledge; correct?

A That's correct.

Q Just for reference before we proceed, I'd like you to look at the next page of the same exhibit, which is Gulf's response to Interrogatory Number 21, and that purports to show the number of meters per municipality for three cities, Fort Walton Beach, Panama City Beach and Pensacola; correct?

A Yes, sir.

Q And that information is true and correct to the best of your knowledge, is it not?

A That is correct.

Q Okay. Now I am trying to make this as brief as possible, Madam Chairman. But I was required to lay this

foundation, so here I go.

Will you agree that at peak the number, the percentage of customer meters that were out of service in Panama City Beach was a whole lot less than the percentage of customer meters that were out of service in Pensacola?

A I would agree. But there needs to be an understanding that in some of these communities such as Panama City Beach the number of meters at times will be grouped up in certain locations because of condos and high-rises, so it doesn't necessarily reflect the same quantity of separate facilities.

Q I'm glad you mentioned condos and high-rises. Is it true for Gulf's service area that condos and high-rises are generally served by underground service?

A Yes.

Q Thank you. Similarly, continuing on with our discussion about Gulf's data, will you agree that the restoration of service to customers in Panama City Beach was overall much more rapid than the restoration of service to customers in Pensacola?

A I would agree with that. But at the same time with what I understand as far as damage after the storm, the restoration time was quicker based on the overall damage and impact of the storm.

Q Did you do any analysis of these data or similar data

in an attempt to compare underground versus overhead facilities' performance in your work preparing Gulf's Storm Hardening Plan?

A No, in the sense of doing a, a type of study or full analysis versus reviewing the type of information that we had as far as our field experience, overall observations over the years.

Q I have a couple of questions for you relating to Page 11 of your testimony where you discuss or rebut, endeavor to rebut Mr. Rant's discussion of CAIDI, which is Customer Average Interruption Duration Index.

Madam Chairman, I want to ask the witness a little bit about Page 21 of 22 of Mr. Rant's rebuttal testimony, which is another Gulf interrogatory response. If you could look -- I think if you turn two more pages from where you were last, you'll get to it, Mr. Battaglia.

A Page 21?

Q Yes, sir. Page 21 of 22.

A I'm there.

Q Okay. And to the best of your knowledge -- and actually it continues on to Page 22. This is Gulf's data as provided by Gulf in an interrogatory response; correct?

A That is correct. This is Gulf's data based on a systemwide calculation.

Q And do I understand correctly that, that these

reliability index -- well, do I understand correctly that these represent reliability indexes?

A That is correct.

Q Okay. And is it correct that SAIDI is System Average Interruption Duration Index?

A That is correct.

Q And that SAIFI is just an Average Interruption Frequency Index?

A That is correct.

Q Is it correct that a lower value for each of these indexes is better than a higher value when one wants to evaluate reliability?

A That is correct.

Q I want to ask you a couple of questions regarding your testimony about CAIDI between Lines 9 and 16 on Page 11. You make the statement as part of a sentence in Line 13 that CAIDI is always much higher for underground than overhead. Is that accurate? At least is that an accurate representation of your testimony?

A That is correct.

Q Okay. So my question for you is wouldn't a higher underground percentage lead one to expect a higher CAIDI value?

A Repeat that one more time, please.

Q Following from your statement that I just read into the record, wouldn't a higher percentage of underground

distribution facilities in an area imply or lead one to expect a higher CAIDI value for that area?

A Based on that question, that's correct. But it's also dependent upon when you do comparisons that you are comparing apples to apples and to be able to look at perhaps one community and look at the overhead versus underground versus across communities because of possible differences.

Q On average would you not expect communities with higher underground percentages to have higher CAIDI values?

A That's correct.

Q Thank you. At Page 6 of your testimony, Mr. Battaglia, you talk about the sugar white, fine sand beaches of the award winning, nationally, internationally recognized Gulf Coast beaches, which I'm sure you and I love equally, correct, or at least a lot?

A Yes, sir.

Q Okay. Simple question. Did you do any comparison of the soil or sands on the Gulf Coast beaches to those in the barrier islands in North Carolina referenced in Mr. Rant's testimony?

A I did not.

Q Okay. At Page 4 of your testimony you talk about loop fed or looped underground construction.

A Yes, sir.

Q Is looped underground construction the standard

technique on Gulf Power's system?

A Loop construction in the construction of what type of installation? In reference to -- or repeat the question, please.

Q Certainly. And I'm happy to try to define the scope better.

The question I wanted to ask you is whether looped, looped underground construction where Gulf Power Company uses underground construction is the standard. Now perhaps I should say in a new subdivision would looped underground construction be the standard applied by Gulf Power in designing and constructing that underground system?

A It is, it is the preferred standard of construction whenever it is capable of being done within the subdivision.

Q And following on that response, will you agree that looped underground construction is good engineering practice?

A For day-to-day operational practices, that's correct.

Q If you know, would you agree that looped underground construction is widely used by utilities in the southeastern United States?

A I do not know how widely used as far as a looped system and within the area specified.

Q Thank you. At Page 10 of your testimony you make the statement that it is Gulf's position that the analyses recommended by Mr. Willoughby and Mr. Rant are already

underway. I just have a couple of questions about that.

First, I think -- yes. Right in that paragraph you talk about your GIS system.

A And this is on Page 11?

Q I'm sorry. I'm at Page 10 now, and specifically the "already underway" phrase is at Line 16, and you refer to your GIS system at Line 5 and again at Line 8.

A Yes, sir.

Q Yesterday we talked briefly about your distribution GIS system and you told us that the mapping of Gulf's distribution system into its distribution GIS system was complete. Did I get that right, is complete?

A That is correct.

Q Thanks. When was that completed?

A I do not know as far as an actual completion date.

Q Okay. Thank you. I'm done talking about the distribution GIS system. I just want to ask you about the, the assertion at Lines 14 through 16 that it's Gulf's position that the analysis recommended by Panama City Beach's witnesses is already underway.

Can you point us to a time, a date at which that analysis was begun?

A And what I'm referring to in that particular sentence as far as already underway is with the approval of the ten-point initiatives that basically started us on the journey

of collecting more granular outage information as far as underground and overhead. And as we moved from the ten-point initiatives into the Storm Hardening Plan as far as the additional system changes that we've been methodically putting into place to collect not just the physical data associated with outages overhead and underground, but also the associated cost information so we would have both pieces of that picture.

Q And in the context of this discussion are you referring exclusively to storm restoration -- to data collected after named storms?

A No, I'm not. I'm referring to the fact that it's, actually it's several parts involved. We're collecting the system changes we've put into place. We'll do, first off, collect data, cost differences between underground and overhead during normal days, during those afternoon thunderstorms. And then the other part of the picture is putting into place the forensic data gathering process that would allow us to collect it, collect that cost, excuse me, collect that physical damage information, along with also putting into, setting up the system for capturing the costs so that we would be able to discriminate between what was involved with restoring the overhead, what was involved with restoring the underground. And then in addition to that, the wind monitors which have already been monitored or already been mentioned as far as having those part of our study base, part of our data input to

get the associated wind information, again, to put that total picture together.

Q Have you collected any data yet in this effort?

A Yes.

Q And --

A We began -- I'm sorry.

Q No. Please feel free to explain your answer.

A All right. Yes, in the sense that the systems to collect that day-to-day information are in place and working now as far as with our trouble call management system to be able to capture, again, the information associated with overhead, underground outages, the what, when, where type information that would again provide the data needed to help us with analyzing those differences.

Q And would I understand correctly that that system was implemented this year?

A In actuality that particular system as far as setting up the, or doing the program that would allow us to capture that information, we did that late 2006, did some initial testing to be sure it would collect it as, as we wanted it to, and then went into full operation as far as getting away from a beta testing, if you would, to actually going forth with it.

MR. WRIGHT: Thank you, Mr. Battaglia. That is all the questions I have.

Thank you, Madam Chairman.

CHAIRMAN EDGAR: Are there questions on cross from any of the other parties?

MR. SEIVER: None from FCTA.

CHAIRMAN EDGAR: No. No. Okay. Thank you. And I understand no questions from staff.

MS. FLEMING: No questions.

CHAIRMAN EDGAR: Commissioners? No questions. Redirect?

MR. BADDERS: Very, very brief redirect.

REDIRECT EXAMINATION

BY MR. BADDERS:

Q Mr. Battaglia, you were asked several questions about Panama City Beach and Pensacola with regard to the impacts of Hurricane Dennis.

A Yes, sir.

Q Did Hurricane Dennis hit Panama City with the same force as it did Pensacola?

MR. WRIGHT: I object to that question. I don't think he's competent to answer that. He's not a meteorologist. There's meteorological data in the record that speaks for itself.

MR. BADDERS: Can I try to reform the question?

CHAIRMAN EDGAR: You may try to rephrase the question.

MR. BADDERS: I'll rephrase the question.

BY MR. BADDERS:

Q Mr. Battaglia, are you familiar with the reports on Hurricane Dennis from the National Hurricane Center?

A Yes, sir.

Q And did you review those with regard to the impacts on Pensacola and Panama City?

A Yes, sir.

Q From that did you make an observation based on the impact on each of those two locations by Hurricane Dennis relative to one another?

A Yes, sir.

Q What is that observation?

A In my observation as far as, again, the premise that the winds were greater in Panama City Beach versus Pensacola. When I reviewed the additional weather data, the listing from which those were pulled from, which I believe was Page 12 of the report, it does show as far as additional data for the wind speeds and all that showed the Pensacola area having experienced some winds greater than that of Panama City Beach.

Q With that in mind, do you believe that comparing the distribution system performance in Pensacola and Panama City after Hurricane Dennis is a fair comparison?

A I do not.

MR. BADDERS: No further questions.

CHAIRMAN EDGAR: Commissioner Argenziano.

COMMISSIONER ARGENZIANO: Now that prompted a question from me. How much greater do you recall the winds being in Pensacola?

THE WITNESS: If I, if I may refer you to the schedule exhibit in my rebuttal. Again, I do not remember off the top of my head. If that's, if that's okay, Commissioner. Excuse me.

And I apologize. I stand corrected that we did not actually include the hurricane data in there. But if it's okay to --

COMMISSIONER ARGENZIANO: Yeah. Madam Chair.

CHAIRMAN EDGAR: Commissioner.

COMMISSIONER ARGENZIANO: I'm just curious now as to what degree the difference in winds there were.

MR. WRIGHT: Madam Chairman, if I may.

CHAIRMAN EDGAR: You may.

MR. WRIGHT: Thank you. The document is in the record. It is, I think, Exhibit 35. It came in through the testimony of Mr. Rant, and it is the final tropical cyclone report for Hurricane Dennis. And actually I know he's got one because he's got my copy of my witness's testimony. And I can, I can hand you a copy right now, if that would help.

COMMISSIONER ARGENZIANO: If anybody would like to give -- by the time I find it, we'll be here a few days. So if somebody has it readily available.

THE WITNESS: With Mr. Wright's help.

COMMISSIONER ARGENZIANO: Sorry.

CHAIRMAN EDGAR: That's okay.

THE WITNESS: In the end report for Hurricane Dennis -- let me make sure I'm in the right area.

COMMISSIONER ARGENZIANO: Thank you. Thank you.

MR. WRIGHT: Certainly.

COMMISSIONER ARGENZIANO: We still may be here a few days. That's okay.

(Laughter.)

THE WITNESS: And I did find my copy finally.

COMMISSIONER ARGENZIANO: Okay.

THE WITNESS: If you -- in the report if you look at Page 11 at the bottom and you see the sustained and gust speeds for Panama City Beach --

COMMISSIONER ARGENZIANO: Uh-huh.

THE WITNESS: -- and if you flip to the next page, Page 12 towards the top there, you see the sustained and gust wind speeds for Pensacola, and it has the little (f) as far as referencing that that's a National Oceanic Atmospheric site. But when you look at the data just above it, it shows the 71 sustained, 83 gust, 66 sustained, 81 gust in comparison to what was shown over in Panama City Beach of 51 and 63. And that's where I was concluding or partially concluding that, again, Pensacola did experience winds greater than Panama City

Beach.

COMMISSIONER ARGENZIANO: And, Madam Chair, what are the -- excuse my ignorance here. What are the other numbers below indicating Pensacola at 35, 39 and 71? That's a tower reading, I guess.

THE WITNESS: Again, I'm not an expert in interpreting, but these are various locations in which they apparently had wind monitors that they pulled the data from.

COMMISSIONER ARGENZIANO: So then they range from 39 to 71; correct?

THE WITNESS: Yes, Commissioner.

COMMISSIONER ARGENZIANO: Okay. Thank you.

MR. WRIGHT: Madam Chairman, may I?

CHAIRMAN EDGAR: Yes.

MR. WRIGHT: Just, just to clarify.

RECROSS EXAMINATION

BY MR. WRIGHT:

Q Mr. Battaglia, I'd like to ask you to look at Page 15 of the tropical cyclone report, and particularly to look at what is designated as Footnote F.

A Yes, sir.

Q Will you agree that that footnote applies to the Panama City Beach information and also to the fourth row on Page 12, which just says "Pensacola"?

A Yes, sir.

Q And that it, it reflects that those were taken from national ocean service stations and that the sustained winds reported are six-minute averages?

A Yes, sir.

MR. WRIGHT: Thank you.

CHAIRMAN EDGAR: Mr. Badders, do you have any additional questions or any additional redirect in light of the additional questions?

MR. BADDERS: I do not. I do not.

CHAIRMAN EDGAR: Okay. Okay. Let's take up the exhibit.

MR. BADDERS: We would move the admission of this exhibit, Exhibit Number 39, into the record.

MR. WRIGHT: No objection.

CHAIRMAN EDGAR: Seeing no objection, Exhibit 39 will be entered into the record for the Gulf docket.

(Exhibit 39 admitted into the record.)

MR. BADDERS: And I guess just for clarity of the record this testimony was offered in Docket 070299. I may not have made that clear up front.

CHAIRMAN EDGAR: That is my understanding.

MR. BADDERS: Thank you. Can this witness be excused?

CHAIRMAN EDGAR: And this witness is excused. Thank you very much.

MR. BADDERS: The next witness would have been Mr. McDaniel's rebuttal. That has been withdrawn.

CHAIRMAN EDGAR: Yes.

MR. BADDERS: And his exhibit has also been withdrawn, so we will not need to move that into the record.

CHAIRMAN EDGAR: Thank you. That brings us, Mr. Butler, to your witness.

MR. BUTLER: Thank you. Yes, to Mr. McEvoy. I'd call Mr. McEvoy to the stand.

MR. WILLIS: Before Mr. McEvoy comes to the stand, Madam Chairman, I believe that we have now agreement on Exhibits, excuse me, on Issues 7, 12 and 13 in the Tampa Electric docket, which is 070297-EU, and in effect have stipulations to, to those three issues. And I wonder if you could confirm that and perhaps excuse Tampa Electric from further participation.

CHAIRMAN EDGAR: Okay. We did earlier change for the benefit of the record the position of FCTA on Issue 7, 12 and 13 in the TECO docket from "No" to "No objection." May I understand from that that that is the same thing as agreement?

MR. WILLIS: Yes.

MR. SEIVER: Yes.

CHAIRMAN EDGAR: Okay. Ms. Fleming, is there any reason at this point in the proceeding, realizing the agreements that have been reached and the information entered

into the record on the TECO docket, that TECO needs to remain with us for the rest of the day?

MS. FLEMING: If there are stipulations among the parties, I would suggest -- staff would recommend that the Commission vote on these stipulations on the last three remaining issues for TECO.

Staff would note for the record as far as Issues 7 and 12, AT&T, FCTA, TCG and Verizon take no position. And on Issue 13, AT&T, FCTA, Embarq, TCG and Verizon take no position. And staff would recommend that the stipulations be approved with a note of the modification to Issue 12 that was previously stated on the record.

CHAIRMAN EDGAR: Okay. Commissioners, my understanding as to where we are at this time is, as you've heard from staff, we have a request from the parties in the TECO docket, TECO and FCTA, with no position from the other parties in that docket and a recommendation, excuse me, a recommendation from our staff that we go ahead and approve the stipulated language to Issues 7, 12 and 13, with the modification to Issue 12 as noted by Ms. Fleming. I know that's a lot, but are there any questions?

COMMISSIONER CARTER: I have a question.

CHAIRMAN EDGAR: Commissioner Carter.

COMMISSIONER CARTER: Does that resolve all the issues within the confines of that docket?

MS. FLEMING: Yes. This will resolve all the issues of the TECO docket.

COMMISSIONER CARTER: Okay. At the appropriate time I'd move staff.

CHAIRMAN EDGAR: Are there any questions? No questions. Okay. Commissioner Carter has moved the recommendation of staff on these items in the TECO docket. Is there a second?

COMMISSIONER SKOP: Second.

CHAIRMAN EDGAR: There's a motion and a second. All in favor, say aye.

(Unanimous affirmative vote.)

Opposed? Show it adopted.

Any other matters we need to address for Mr. Willis?

MR. WILLIS: I just wanted to again express how much we appreciate your indulgence in allowing us time and consideration to, to come to the agreements that we have. And I'd also like to express our deep appreciation for staff in keeping up with all the papers and keeping us straight within all these dockets. They've done a really superior job in that respect and we appreciate it very much.

CHAIRMAN EDGAR: Thank you, Mr. Willis. And I assure you I appreciate it as well.

Okay. Then, Mr. Willis, you are excused. Thank you so much. And, Mr. Butler, your witness.

MR. BUTLER: Thank you, Madam Chairman.

Before I get started introducing Mr. McEvoy and his testimony, I handed out during the lunch break a package that consisted of two pages, the top of which says "Proposed Revisions to FPL's rebuttal testimony," et cetera, and it relates, the top page, to Mr. McEvoy's testimony. Do each of you have that, seeing that the Chairman is still looking? I have another one here for you.

CHAIRMAN EDGAR: I saw it earlier, but I cannot seem to put my hands on it. Thank you. Speaking of people who can keep their papers straight and those of us who are a little challenged on it. Thank you, Mr. Butler. Is everybody else there?

Okay. Mr. Butler.

MR. BUTLER: The purpose, the purpose of really both of the pages, but focusing for the moment on the top one, this is a compilation of the withdrawals of portions of Mr. McEvoy's testimony based on the stipulations and partial stipulations and withdrawals of other testimony to which he was rebutting. And I would like to identify this as the next exhibit, which I think would be Exhibit 53.

CHAIRMAN EDGAR: Yes. Exhibit 53. And do we have a copy of this to the court reporter?

MR. BUTLER: I did leave one for her. Do you have a copy of it there, Madam Court Reporter?

CHAIRMAN EDGAR: It's headed "Proposed Revisions to FPL's rebuttal testimony."

THE COURT REPORTER: I've got it.

CHAIRMAN EDGAR: Okay. Thank you.

(Exhibit 53 marked for identification.)

MR. BUTLER: All right. Thank you. One other housekeeping matter that this is probably as good a time to bring it up as any, it relates to the withdrawal of portions of testimony. Mr. Seiver and I have discussed the fact that with these withdrawals of testimony, we have in the record deposition transcripts where the questioning in the depositions to some extent relates to areas of people's testimony that have now been withdrawn. And we both agree that it would be an extremely difficult task to try to go through and identify page and line of what would end up being taken out of the depositions, but we would like to propose that all parties agree that portions of depositions that relate to the withdrawn testimony of witnesses would not be properly part of the record that would be cited and, you know, referenced as evidence in the briefing of this matter after the hearing.

CHAIRMAN EDGAR: Mr. Seiver, do you have any -- Mr. Seiver.

MR. SEIVER: We're in agreement, Madam Chair. Thank you.

CHAIRMAN EDGAR: Ms. Fleming, any concerns?

MS. FLEMING: I think for the reasons stated by Mr. Butler this will probably be the most efficient way to deal with this.

CHAIRMAN EDGAR: I understand. Thank you for raising that, Mr. Butler. Mr. Seiver, thank you for your cooperation as well.

MR. BUTLER: Thank you, Madam Chairman.

With that, I will introduce Mr. McEvoy.

JOHN J. McEVOY

was called as a witness on behalf of Florida Power & Light Company and, having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. BUTLER:

Q Mr. McEvoy, would you please state your name and business address for the record.

A John J. McEvoy, 2455 Port West Boulevard, West Palm Beach, Florida 33407.

Q And have you been previously sworn?

A Yes, I have.

Q Okay. Do you have before you a document entitled Rebuttal Testimony of John J. McEvoy dated September 14, 2007, consisting of 19 pages?

A Yes, I do.

Q Okay. And I believe you have a copy with you of what we've marked as Exhibit 53 being the withdrawal of portions of,

or identification of withdrawal of portions of your rebuttal testimony.

A Yes, I do.

Q Okay. As modified by the withdrawal of the portions of your testimony identified on Exhibit 53, do you adopt this rebuttal testimony or this prefiled testimony as your rebuttal testimony in this docket?

A Yes, I do.

MR. BUTLER: Okay. Madam Chairman, with the revisions reflected on Exhibit 53, I would ask that Mr. McEvoy's testimony be inserted into the record as though read.

CHAIRMAN EDGAR: The rebuttal testimony of the witness will be inserted into the record as though read, reflecting the errata changes from Exhibit 53.

MR. BUTLER: Thank you. And I would note that there are no exhibits attached to Mr. McEvoy's rebuttal testimony.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

REBUTTAL TESTIMONY OF JOHN J MCEVOY

DOCKET NO. 070301-EI

September 14, 2007

Q. Please state your name and business address.

A. My name is John J. McEvoy. My business address is Florida Power & Light Company, 2455 Port West Boulevard, West Palm Beach, Florida, 33407.

Q. By whom are you employed and what is your position?

A. I am employed by Florida Power & Light Company (FPL or the Company) as Manager of Product Support Power Systems Distribution.

Q. Please describe your duties and responsibilities.

A. I am responsible for maintaining the Distribution Construction Standards ("DCS"), Distribution Engineering Reference Manual ("DERM"), and Product Specifications for overhead ("OH") distribution equipment.

Q. Please describe your educational background and professional experience.

A. I have a Bachelor Degree in Electronic Technology from the University of Dayton, Dayton, Ohio. I joined FPL in 1973 and have served in a variety of positions in distribution operations. I have been an Engineering Technician, Industrial Engineering Analyst, Superintendent Meter Test Center, Manager responsible for customer metering and distribution product/standards since

1995. I have been actively involved for the past 15 years with various American National Standard Institute Committees, Edison Electrical Institute Committees, Association of Edison Illuminating Companies (Past Chairmen of Meter & Service Committee). For the past 12 years, I have managed the organization responsible for the DCS and the DERM for FPL.

Q. Please summarize your responsibilities relevant to this proceeding.

A. I am the manager for the engineering team that developed the DERM addendum for Extreme Wind Design and I manage the OH Forensic Team now and during the 2004 and 2005 storm forensic efforts.

Q. Are you familiar with the National Electrical Safety Code ("NESC")?

A. Yes. The NESC is the national safety code for the practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines and associated equipment. The NESC is not intended as a design specification or as an instruction manual. Rather it is a set of rules that comprise safety standards applicable on a national base. If, as is often the case, a utility has reasons to exceed these minimum standards, it is free to do so.

Q. Do you consider yourself knowledgeable concerning the NESC and its application to electric distribution systems?

A. Yes. Part of my responsibilities for the past 12 years has been to review the NESC rules to insure they are incorporated into our standards.

Q. What is the purpose of your rebuttal testimony?

A. I will respond to the portions of the testimony of ~~Verizon Florida LLC witness Lawrence M. Slavin and Florida Cable Telecommunications Association, Inc.~~ witness Michael T. Harrelson that relate to their objections to FPL's applying extreme wind loading criteria ("EWL") to distribution facilities under the May 7, 2007 Electric Infrastructure Storm Hardening Plan (the "Plan") because the NESC does not require FPL to do so.

Q. Dr. Slavin says that the NESC Committee has considered and rejected EWL for poles less than 60 feet, because the benefits of EWL are projected to be slight in most storms involving extreme wind since damage to structures results primarily from falling trees and branches and flying debris striking lines rather than the wind pressure imposed on the structures and lines themselves. Do you agree that this is a valid reason for FPL not to apply EWL to distribution faculties under its Plan?

A. No. I understand Dr. Slavin's and the NESC's position on this issue, as it is the same position that FPL took until Hurricane Wilma struck our service territory in 2005, the seventh storm that had impacted us over a 15-month period. I also understand that any change in a national construction standard, especially a significant change such as adopting EWL standards for distribution facilities nationwide, has to be carefully researched and analyzed before it can be adopted. However, my experience in the forensic effort for Hurricane Wilma and the conclusions of the KEMA report on that effort indicated that "wind only" was the predominant root cause of distribution pole breakage. FPL cannot ignore this direct, relevant data and simply hide behind

the general 60 foot exclusion in the minimum national standard reached by the NESC Committee. The implications of this data must be addressed in our Plan.

The NESC clearly contemplates that utilities may decide to implement design standards that exceed the NESC's minimums. Section 25, 250A-4 of the NESC states that "It is recognized that loadings actually experienced in certain areas in each of the loading districts may be greater, or in some cases, may be less than those specified in these rules. In the absence of a detailed loading analysis, using the same respective statistical methodologies use to develop the maps in Rule 250C or 250D, no reduction in the loadings specified therein shall be made without the approval of the administrative authority."

Q. In response to FPL's Interrogatory No. 6, the FCTA outlined a procedure that it claims could be used to reflect the impact on EWL pole-strength requirements due to the guying effect of supply wire and telecommunications wire/cable. Has the NESC approved the use of the procedure outlined by the FCTA?

A. To the best of my knowledge, it has not.

Q. Is FPL aware of any NESC-approved adjustments that can be used to reflect the impact on EWL pole-strength requirements due to the guying effect of supply wire and telecommunications wire/cable?

A. No. There are currently no load factors that are specified in the NESC that provide for the possible guying affects of supply wire or telecommunications wire. As discussed earlier, the NESC has defined what is needed in order for the NESC to approve a reduction in loading requirements below those specified for EWL. "In the absence of a detailed loading analysis, using the same respective statistical methodologies used to develop the maps in Rule 250C or 250D, no reduction in the loadings specified therein shall be made without the approval of the administrative authority."

Q. Does FPL currently have the necessary information to develop the analysis that would be needed to propose such a change in the NESC EWL guidelines?

A. No. The idea on its surface has some merit but there are many considerations that must be better understood. For example, when evaluating FPL wires:

- A span of conductor may have the necessary strength, but this conductor is installed with some amount of sag and at much less tension than its rated breaking strength. To achieve the guying benefit, the pole will deflect until the crossing conductor has been pulled up to tension. At this point the pole may have already broken
- The method of attaching the conductor to the insulator is much different than attaching a down guy or storm guy. The weak point may be in the method of attachment, the insulator and/or crossarm.
- Most insulators are attached to the side of the pole. The effect of the torsional load on the pole due to this side attachment is not yet understood.

Also, the effect of the torsional load on the insulator mounting bolt is not yet understood.

When evaluating telecommunications wires/cables:

- How much sag is in the telecommunications wire/cable and how much the pole will deflect before the "guying effect" comes into play must be understood.
- How is the telecommunications wires/cables attached? If it is on the side of the pole, then it could induce torsional load on the pole.
- If you consider that the point of attachment for the telecommunications wires/cables is fixed, then the moment arm for the supply wires are reduced to that point. However, the diameter of the pole is much less than at ground line and this may now be the weak point of the pole. The pole may have a good chance of breaking above the telecommunication attachment (a condition that was observed during the Hurricane Wilma forensic investigation).

Although we have not formally begun an evaluation to look into these questions, we have had discussions both internally and with our design software vendor to better understand them. If these informal investigations indicate there is a possibility of using the guying effects of current wires (even if some design changes are needed) in future installations, we will proceed with a more formal evaluation. FPL is very interested in pursuing any means available to help control the cost of its hardening projects and certainly will take the necessary steps to pursue this issue thoroughly.

Q. Mr. Harrelson suggests that the wind loading effect of fiber optic cable, which he states has a 0.59"diameter and a weight of 0.05 pounds per foot, does not significantly increase the load on poles. Do you agree with Mr. Harrelson?

A. No. Assuming a 0.59" diameter cable (as referenced at pp. 40 & 42 of Mr. Harrelson's testimony) and a typical span of 200 feet, this means almost 10 square feet of additional surface area within a given span, which can catch wind like a sail. For a class 2 wood pole in the 145 mph EWL wind zone, this equates to approximately 10% of the available strength of that pole.

Q. Would you please discuss FPL's past forensic efforts?

A. After FPL was hit with 3 hurricanes in 2004, I managed an effort to develop a systematic approach for evaluating the root causes of equipment failure during hurricanes. FPL's previous storm restoration efforts had always focused on using all available resources to restore service after a storm event, without specifically setting aside resources to determine causes of system failures. Since this approach did not generate any specific data to determine causes of failures, FPL had to rely upon high-level indicators of failed equipment (e.g., number of poles replaced, feet of wire replaced, etc.) and interviews with crews.

Following the 2004 storm season, FPL recognized that this informal forensics system needed to be improved. The main recommendation of this review was to form a forensic team so that future hurricane damage could be investigated

more rigorously. During the later part of 2004 and the beginning of 2005, FPL formed a forensic team comprised of engineers in my group representing over 150 years of cumulative experience with FPL's distribution system. Procedures and process were developed that we subsequently used to perform forensic evaluations of Hurricanes Katrina and Wilma in 2005. Four teams, each comprised of two of my engineers, were deployed immediately after the "all clear" signal was given, in order to gather data prior to restoration crews repairing the damage. As detailed in the KEMA report, a standardized check sheet was used to collect data, pictures were taken at each observation, and notes were made to help determine causes. Our intent was to determine as objectively as possible why equipment failed and to use this data to help us improve system performance and/or restoration time when exposed to future storms.

Q. What did FPL's forensic evaluation conclude when this system was used to evaluate storm damage from Hurricane Wilma?

A. Prior to the Hurricane Wilma forensic evaluation, I (and most of my team members) would have agreed with Dr. Slavin and Mr. Harrelson that trees and debris were the major causes of broken poles during a storm. However, as detailed in the KEMA report, we found that wind was the predominant cause for pole breakage during Wilma. I personally was involved in approximately 20% of the observations made, and in those cases where I observed broken poles that were categorized as due to "wind only," I am thoroughly convinced that was the cause of their failure.

Q. What caused you to arrive at this conclusion?

A. Multiple factors compelled the conclusion that the force of hurricane winds on the poles caused them to fail:

- In almost all of the cases, the pole was broken at least one foot above ground level.
- A significant number of the poles that I observed were relatively new (10 – 15 years old).
- None of these poles had the presence of wood decay.
- In the majority of the cases, the surrounding terrain was not cluttered, precluding the possibility of something getting into the lines causing damage.
- The conductors as well as other equipment did not show any signs of damage other than that sustained when it struck the ground.

Together, these factors all pointed to the conclusion that the poles had failed because they experienced a wind force greater than their design capability.

Q. What remedy has FPL chosen to reduce the likelihood of poles breaking due to hurricane force wind?

A. The remedy we are using is to design our system to EWL as described in the NESC. I know the NESC does not require this for distribution structures that do not exceed 60 feet above ground or water level, but for our service territory it is apparent that using the "Combined ice and wind loading," is inadequate and fails to produce a system that is well suited to withstanding hurricane force winds. The "combined ice and wind loading" category is especially ill-

suited to Florida because it is in the "light loading" area based on the absence of significant icing risk and therefore applies wind-loading criteria that assume exposure to only relatively modest winds. With Florida's exposure to storm winds that regularly exceed this assumption, designing to the "combined ice and wind loading" criteria simply does not seem logical.

EWL requires the designer to address specific wind speeds. The basic wind speed map in the NESC is nominal design 3-second gust wind speeds at 10 meters (33 feet) above ground. ~~As is shown in Dr. Slavin's testimony in Figure 1~~, combined ice and wind loading Grade B construction is not even as strong as an EWL of 105 mph. This agrees with the conclusions in the KEMA report that, when evaluated against EWL criteria, Grade B Combined ice and wind loading is the equivalent of 104 mph. How can we expect a system designed for only 104 mph winds to perform well, when our experience indicates that winds can far exceed that figure during even moderately strong hurricanes? I should point out that the NESC itself recognizes the potential for strong hurricane force winds in our service territory: it defines the winds for EWL construction to be as high as 150 mph.

Q. Do you agree with Dr. Slavin's comments that Hurricane Wilma was a unique event and "it would not be reasonable to introduce dramatic design changes to the distribution plant based on a single storm"?

A. No. The force and character of the winds experienced during Hurricane Wilma were typical of what can be expected from a storm of Wilma's

strength. The damage to the distribution system sustained from Wilma was in line with a storm of this magnitude. At its peak, Wilma was categorized as a low-end category 3 storm. Unfortunately, there is considerable historical precedent to anticipate that storms as strong as Wilma will impact FPL's service territory in the future.

While I agree with Dr. Slavin that performing a forensic analysis is a difficult task and that cautions must be exercised in using conclusions of such a study, the evidence , however, that "wind only" was the predominant cause of pole damage during Hurricane Wilma was overwhelming. There is no reason to believe that our facilities will not be exposed to these type storms in the future, and I do not think one can have a complete plan to address storm outages without designing for these type winds.

Q. Why is FPL using the EWL criteria that apply to Grade B rather than Grade C construction?

A. FPL's system has been traditionally designed to Grade B construction, and FPL does not believe it would be consistent to apply the EWL criteria for Grade C construction for a system that is built to Grade B. NESC allows for different load factors for EWL Grade B and Grade C construction. For Grade C, the NESC allows a load factor of 0.87 for winds of 100 mph or less, and an even lower load factor of 0.75 to be used for winds above 100 mph. If the reduced Grade C load factor were used as recommended by Dr. Slavin, then the effective wind speed for the 145 mph zone would be reduced by 13% to

only 126 mph. FPL has no data to suggest that designing to these lower wind speeds would be appropriate.

FCTA WITNESS HARRELSON

Q. Mr. Harrelson states that square concrete poles are more likely to fail than round poles in the event of a storm. Do you agree?

A. No. Mr. Harrelson correctly states that the NESC requires the use of a 1.6 wind load shape factor for square concrete poles. This value is used to normalize the effect of wind on a square pole to that of a round pole. Using this shape factor results in the proper design strength for EWL when using square concrete poles.

Q. Mr. Harrelson states that the information reported by KEMA does not conclusively support improved resilience of hardened distribution facilities. Do you agree?

A. No, the KEMA report states on page 80 that, "With the forensic data received and assumptions made as described in this chapter, the following conclusions, based on statistical analysis sufficient to perform root cause analysis and to direct engineering solutions, can be drawn. The sample size was sufficient to guarantee results in a range plus or minus 2.2% with 95% certainty."

Q. Mr. Harrelson states that he does not necessarily agree with the KEMA report due in part to "disclaimers" and explanations of assumptions in the report. Do those "disclaimers" and explanations affect the validity of KEMA's conclusions?

A. No. A review of the "disclaimers" and explanations of assumptions that he discusses shows that they do not affect the validity of KEMA conclusions:

- Mr. Harrelson quotes the following from page 50 of the KEMA report: "Specific additions to this forensic study and data collection process together with improved accuracy in the pole population data would enable more specific and targeted engineering solutions." The first sentence in this paragraph, which Mr. Harrelson omits, is "The forensic data as gathered by FPL staff during the restoration of Hurricane Wilma damage was very useful for engineering analysis." The intent of these two statements was to convey that the Wilma forensic analysis was a good start but that developing specific location/feeder recommendations was not possible due to the wide geographical area surveyed. Also, KEMA observed that FPL did not have a pole population data base with all the specifics of each pole and associated equipment with mounting hardware to use for a detailed root cause analysis. These limitations do not affect the report's overall conclusions about "wind only" pole failures, but rather cautions that carrying those conclusions to the level of specific location/feeder recommendations would require additional information.
- The statement quoted from page 58 in Section 7.2.5 states: "FPL verbally confirms that assignment of root causes is a personal judgment call irrespective of the pole ownership." The intent of this statement was to confirm that KEMA agrees that FPL inspectors

investigated pole breakage not considering pole ownership. Thus the team had no bias based on pole ownership.

The forensic inspectors were charged with assigning cause based on their observation that if a assignable cause was obvious (tree on pole or wire, metal awning rapped around pole, etc.) that cause was documented; if there was no apparent cause, information was documented that was used to determine other probable causes such as presence of deterioration if pole contained some decay or if the pole had multiple circuits or large cable attachments. If there was no apparent reason for the pole failure and the pole broke above ground level this was documented as "wind only." Given the high level of experience of the investigators making these evaluations, it is a very accurate method to determine failure causes

- The statement quoted from page 77 in Section 7.4. States: "Design overload is not a major contributor to poles breaking during Hurricane Wilma. Focusing on the 53 FPL owned poles broken with the suspicion of design overload as a contributing factor, most of these were multiple breaks investigated by one inspector." Mr. Harrelson interprets this as KEMA discrediting the "personal judgment call" of the "one inspector". This is not the intent of this statement at all, as KEMA further goes on in that paragraph to explain that the reason that design load is not a major contributing factor is that more detailed

evaluation of these 53 FPL poles did not yield any one identifiable cause other than the relatively high number of attachments.

- Mr. Harrelson states that the forensic data is questionable due to more data gathered on feeder poles while FPL has mostly lateral poles. However, in developing the statistic that 52% of the poles were broken by wind only, KEMA normalized the forensic data to more properly reflect the feeder/lateral pole population thus making the forensic data usable for general pole population results.
- Mr. Harrelson comments that as much as 85% of the broken poles were multiple failures, which is also known as cascading. He further states "that one defective pole or guy wire can allow one pole to break and take down several solid poles which would not have fallen otherwise. Cascading can be started by trees or flying debris hitting facilities on one pole." He fails to mention that cascading can also start by one pole broken due to the effect of wind only. In the cases of multiple pole failures, the investigator thoroughly looked at the entire set of breakage to try to determine what caused any one of the poles to break. If a cause such at a tree was found, that cause was used for all of the poles in that cascading occurrence. Thus, the assigned causes for multiple pole breakage could have come from any of the categories used. I also would like to point out that stronger facilities can limit the number of poles in a cascade, so EWL poles are more likely to stop a cascading failure once it has started.

- Mr. Harrelson quotes KEMA at page 77, Section 7.4 of the report: "the counties and areas with highest pole failure rates coincide with the area with the highest wind speeds and are bordering open areas in the path of hurricane Wilma." Mr. Harrelson then asserts that "This finding validates the well know fact that trees and building shelter lines from winds whereas open areas do not. The trees and flying debris can and do frequently break poles designed to EWL standards." His conclusion is not supported by any data. Certainly, the KEMA report does not support his conclusion. As mentioned earlier, the NESC states in section 25, 250A, paragraph 3 "In the absence of a detailed loading analysis, using the same respective statistical methodologies used to develop the maps in Rule 250C or 250D, no reduction in the loadings specified therein shall be made without the approval of the administrative authority." FPL is interested in investigating what changes can be made to reflect the affect of shielding on its distribution lines, but until shielding effects can be documented in accordance with the above guidelines; we cannot arbitrarily change the calculations shown for EWL in the NESC.
- Mr. Harrelson discusses page 59, Table 7-7 of the KEMA report. He states "that wind only was based upon the personal judgment calls of the inspectors". As I mentioned earlier, the FPL inspectors had a combined experience of over 150 years with FPL and are engineers in the group responsible for FPL construction standards. They used a

process that eliminated as much subjectivity as possible in determining the cause of pole failures. We were interested in collecting valid forensic information to help the distribution system better withstand hurricanes and knew that invalid data would not be helpful. There was no bias or incentive to influence the collection of data toward one cause of failure versus another. Frankly if there had been any bias at all, it would have been *against* concluding that poles failed due to wind only, based on the inspectors' prior experience and expectations.

In short, FPL's forensic team used a carefully structured forensic process that included multiple reviews of how to do an observation, and what to look for when recording data. Mr. Harrelson has not supplied any forensic data to support the conclusions about pole failures stated in his testimony. It is *his* conclusions, not those of the FPL inspectors, that rely heavily on personal judgment.

- Mr. Harrelson makes the statement "A better forensic analysis would have sought to determine the cause or causes of the cascading failures which accounted for 85% of the recorded failures." As I discussed in the previous bullet, this is exactly what the forensic team did, assign a cause for both single pole failures and multiple failures.
- Mr. Harrelson further refers to KEMA Table 7-7 indicating "Table 7-7 attributes only 12% of the lateral pole failures to wind only, 33% is attributed to tree and 47% to presence of deterioration. Lateral lines

are the smaller lines which serve such area as neighborhoods where more trees and building are common. Significantly, 55% of FPL poles broke during Wilma were lateral poles." Mr. Harrelson is correct in his statements. The reason the overall percentage of pole breakage due to Wilma is 52% is because, as Table 7-7 indicates, the feeder pole breakage due to "wind only" was 66%. While FPL is concerned with the storm resilience of all its distribution poles, it is especially important to harden the feeder poles because a feeder failure affects many more customers that a lateral failure.

- Mr. Harrelson cites page 68 of the KEMA report, which "refers to a group of wind only failures where half of them fell to the east and half of them fell to the west." He goes on to assert that "This is consistent with an embedded tornado-type wind for which EWL would not likely provide adequate protection." As it so happens, this location was approximately 10 miles from my house. The eye of hurricane Wilma passed directly over my house and this area described. Of course, the wind direction in the leading eye wall is opposite the direction in the following eye wall. I observed these pole breaks, and there was no surrounding area damage that would be consistent with tornado activity. Instead, the phenomenon of some poles falling in one direction while the others fell in the opposite direction resulted from the switch in wind direction after the hurricane's eye passed over the area in question.

- Mr. Harrelson states that "on page 80 KEMA concludes that wind was the predominant root cause of pole breakage in general and tree breakage causing pole breakage in particular." Mr. Harrelson is not correct; this statement was included in the KEMA report section 7.4 "Integral analysis and interpretation" page 78, not in the conclusions section. In section 7.4, KEMA discusses different factors that were used to analyze the data, ruling some factors as usable and some as not. However in the conclusion section 7.5, KEMA states "Wind is the predominant root cause of pole breakage based on analysis of the forensic data collected after Hurricane Wilma." In fact looking at all FPL wood pole breakage data in the report, 52% was due to "wind only," while only 20% was due to trees.

In summary, Mr. Harrelson has misinterpreted much of the data in the KEMA report. The report accurately reflects the efforts of the forensic team and is the most detailed analysis to date of any hurricane damage to a distribution utility system. I stand by its conclusions.

Q. Does this conclude your rebuttal testimony?

A. Yes.

BY MR. BUTLER:

Q Mr. McEvoy, would you please summarize your rebuttal testimony?

A Good afternoon, Commissioners. The purpose of my rebuttal testimony is to respond to FCTA Witness Michael T. Harrelson that relates to his objections to FPL applying extreme wind loading criteria to distribution facilities. Following the 2004 storm season, FPL recognized the need to develop a forensic storm follow-up process so that future hurricane damage could be investigated more rigorously.

During the latter part of 2004 and the beginning of 2005 I formed a forensic team comprised of engineers in my group representing over 150 years of cumulative experience with FPL's distribution system. Our intent was to objectively determine why equipment failed and to use this data to help us improve system performance and restoration time when exposed to future storms. Procedures and processes were developed that we subsequently used to perform forensic evaluations of Hurricane Katrina and William in 2005. We used a standard size -- a standardized check sheet to collect specific data, pictures were taken at each observation and notes were made to determine failure causes. The result of this forensic effort as detailed in the KEMA report found that over 50 percent of the broken poles experienced during Wilma were the result of extreme wind forces that these poles experienced. Thus, these poles failed

due to wind-only damage.

In my rebuttal testimony I responded to the issue that the National Electric Safety Code has considered whether to apply extreme wind loading criteria to distribution lines 60 feet or less in height but has retained the 60-foot exemption. After my experience in the forensic effort in Hurricane Wilma and the conclusions of the KEMA report on that effort indicated that wind only was the predominant cause of distribution pole breakage, I no longer believe the 60-foot exemption can be used for FPL's service territory. FPL cannot ignore this direct relevant data and must address the effects of extreme wind damage to our distribution facilities in any plan for improved future hurricane system performance.

Mr. Harrelson comments that the many broken poles during Hurricane Wilma were multiple failures known as cascading and these events can be started by trees or flying debris. He fails to mention that cascading can also start by one pole broken due to the effect of wind only. In the case of multiple pole failures, the forensic team looked at the entire set of breakage to determine what cause of any one pole to break. If the cause of the cascading event was determined as wind only, only then were those poles classified with that cause. Also, as stronger poles are used for extreme wind loading, they are more likely to stop cascading failure once it has started. Hurricane -- I'm sorry. Mr. Harrelson asserts

that the KEMA findings validate the fact that trees and buildings shelter lines from winds. Mr. Harrelson also contends that FPL should consider the guying effects of either power lines or cable attachment lines when designing for extreme wind loading. Mr. Harrelson does not support his conclusions with any data. FPL is interested in investigating what effect trees or buildings have on shielding our facilities or possible guying effect of crossing lines. But as the National Electric Safety Code states, in the absence of a detailed statistical loading analysis, no reductions in the loading shall be made.

FPL is interested in investigating what changes can be made to the National Electric Safety Code extreme wind formulas, but making adjustments to the calculation shown for extreme wind in the National Electric Safety Code and still expecting to deliver the level of wind loading those formulas provide is not prudent without supporting data. Mr. Harrelson has misinterpreted much of the information in the KEMA report. The KEMA report accurately reflects the efforts of the forensic team and is the most detailed analysis to date of any hurricane damage to a distribution system in the nation. I stand by its conclusions. Thank you.

MR. BUTLER: I would tender Mr. McEvoy for cross-examination.

CHAIRMAN EDGAR: Are there questions on cross?

MR. SEIVER: Yes. Thank you, Madam Chair.

CROSS EXAMINATION

BY MR. SEIVER:

Q Mr. McEvoy, good afternoon.

A Good afternoon.

Q In your summary you made a comment about Mr. Harrelson's testimony in particular about the guying effects of power line conductors, cable conductors, and you said that there was nothing to support that in the NESC, or did I misunderstand you?

A There -- I believe the statement I made is there's no supporting data for that contention.

Q In your own experience in your years of being a construction, involved in the construction of the overhead plant for Florida Power & Light, do you have any personal experience or understanding as to the guying effects of power laterals or communication lateral lines on the poles?

A Not to the extent that you could put it in any kind of formula in order to participate -- or in order to result in some sort of design standard. No, sir.

Q And you said because of that there would be no reductions in loading made. But didn't Mr., Mr. Harrelson testify that instead of reducing the loading calculations, that the guying effects could be used to satisfy the loading calculations?

A I did not interpret it that way.

Q You also said that Mr. Harrelson misinterpreted some of the findings in the KEMA report, and I believe we spoke about many of those findings at your deposition and I will reserve on most of those now. But a particular one that I need to ask you about is the NESC's, you call it a 60-foot exemption. As you understand it, the NESC does not apply extreme wind to structures 60 feet and lower; is that right?

A I believe what the NESC states, it does not require structures 60 feet or lower to be built to extreme wind loading standards.

Q In determining the speed force of the winds for extreme wind purposes you used the NESC contours, is that right, the wind contours?

A The basic wind speed map shown in the NESC. Yes, sir.

Q And you used that to make your determination to apply the wind speeds in the various locations that are within those contours in FPL's service territory; right?

A What our plan -- we've used that as a basis. What our plan does is, as you know, we have determined three wind zones for our service territory, and those wind zones depict the highest wind contour within a given county within our service territory so that the 105 and the 130 and the 145 zones adequately address the contours shown in that map. Yes, sir.

Q Do the winds in those wind zones affect taller structures differently than shorter structures to your understanding?

A The basic wind speed map determinations were for ten meters, which is 33 feet. So it's my understanding those measurements were taken at ten meters.

Q And do the standards that apply for extreme wind calculations only apply under the NESC to structures that are taller than 60 feet?

A Again, the National Electric Safety Code says that structures less than 60 feet are not required to use extreme wind loading, and the wind speed map is based on 10 meters or 33 feet.

Q And in applying the -- do you understand the reasoning or rationale behind the NESC's determination to not apply extreme wind to structures 60 feet and under?

A I'm not a member of the NESC committee. No, sir.

Q Well, I didn't really ask you that, Mr. McEvoy.

I said are you aware of the reasoning or rationale behind the NESC?

A No, sir.

Q As far as applying the extreme wind construction standards, do you have any understanding of an adjustment or a modification to those that would make them apply more readily to poles or structures perhaps 40 or 45 feet as most

distribution poles are?

A Could you repeat that question, please?

Q I'm sorry. In determining to apply the extreme wind construction standards, did you make any adjustments to those standards in order to reflect the fact that the poles that they were being applied to were less than 60 feet?

A No. We are using the extreme wind loading from the National Electric Safety Code.

Q Mr. McEvoy, during the time that you've been at Florida Power & Light have you had occasions to examine hurricane wind damage for storms other than Hurricane Wilma?

A Not as part of the formal forensic effort, no, sir. I have been involved as part of the restoration effort for other hurricanes, but not as a forensic effort.

Q Are you aware of the damage to the Florida Power & Light plant in other storms other than Wilma then?

A Again, from a restoration perspective, yes.

One thing we found during the forensic effort, it's amazing how you differently look at a system when you're looking for forensic purposes versus when you're looking for restoration purposes.

Q Well, would it be fair to say then that at least you would agree with this, that Hurricane Katrina, for example, the greater percentage of poles were brought down by trees and not wind only; is that right?

A We did a forensic effort for Hurricane Katrina. So as far as my involvement in that effort, it was from a forensic perspective and not from a restoration perspective. And, yes, a greater amount of poles were brought down due to wind only in Katrina.

Q Were there some wind-only poles brought down in Katrina, do you recall?

A Yes, there were.

Q And for Wilma were there poles that were brought down by trees?

A Yes, there were.

Q Half the poles, something close to that?

A No, sir. I believe the normal percentage, it's in the KEMA report, was about 20 percent due to debris.

Q And in that, your forensics, not only wood poles but concrete poles were brought down by trees; isn't that right?

A That's correct.

Q And in your report not only wood poles but concrete poles were brought down by wood only -- by wind only; is that right?

A Did you say concrete poles brought down by --

Q Yes.

A Yes, they were.

Q And do you understand that as far as a comparison of feeder and laterals, that more feeders came down from wind only

than laterals; is that right?

A I believe that was the case, yes.

Q And -- I'm sorry. And also was it right that increased wind did not correlate with an increased number of wind-only failures for poles that had deteriorated? Do you understand my question?

A One more time, please.

Q I'm trying to get the correlation of increasing winds, and I think there was a comparison of winds from Katrina and Wilma. And there was a finding, was there not, in the KEMA report that I think we talked about at deposition that if you have deteriorated poles, it didn't matter that the increasing wind would bring down more if they were already deteriorated.

MR. BUTLER: Excuse me. I'm going to ask that if Mr. Seiver is, will be examining Mr. McEvoy about specifics from the KEMA report, that he show him the report or point to him the page reference that he's making so Mr. McEvoy can refer to it.

MR. SEIVER: I was trying to avoid, Madam Chair, destroying another tree with the KEMA report being 100 pages and I didn't want to do 2,000 pages, so I was hoping -- but it is, it is in his deposition. And why don't we -- why don't I direct your attention to the deposition. Do you have that handy?

A Yes, I will.

Q If you'd look on Page 60 of your transcript.

A Okay. Page 60?

Q Yes, please. The question at Line 2, the question is "And do you agree with the conclusion that the higher wind speed doesn't bring out the worst in deteriorated poles?" Answer, "In looking over the data, looking at the percentage as you mentioned, it appears fairly constant."

Does that refresh your recollection and make my question any clearer?

A It might, but I may have a different Page 60. Could I --

Q Oh.

CHAIRMAN EDGAR: It happens.

MR. SEIVER: Indulge us, Your Honor.

CHAIRMAN EDGAR: Yes.

MR. SEIVER: I apologize, Madam Chair. This is the same problem we had with a transcript before.

BY MR. SEIVER:

Q Do you have the page now?

A Okay. Now we're there.

Q Did you see the question and answer that I read?

A Would you point me to that?

Q Line 3 -- Line 2 actually.

A Right.

Q "And do you agree with the conclusion that the higher

wind speed doesn't bring out the worst in deteriorated poles?" Answer, "In looking over the data, looking at the percentage as you mentioned, it appears fairly constant."

A Correct.

Q So do you understand now my question that increasing wind speed does not have a direct increase in the number of deteriorated poles that come down in a storm?

A As I recall, the conclusion that KEMA reached was that if a pole had been deteriorated below a certain level, it would fail far below its design level. So, therefore, the deteriorated poles broke before they reached their design level.

Q And then there's -- I had also asked you, asked you if you agree with this, that the increased wind speed did not correlate with an increased finding of wind-only pole failures for feeders. Is that right?

A Is that in the next question?

Q Yes, it is. Line 8 through Line 13.

A Yes. I would agree.

Q And that similarly the increased wind speed does not correlate, I'm sorry, for laterals, so the laterals are not as subject to increased wind speed, wind only.

A That is, that is what the KEMA report stated.

Q Thank you. You also were talking at the end of your summary about cascading. Is that, is that -- am I using the

right term?

A Yes, sir.

Q And would you just describe cascading for us?

A As we have defined it, when you have a, an instance where one or two poles in a tangent line, meaning where you have a number of poles, two, ten, 20 poles in a line, if you have one or two of those poles that break, the additional force or load that is exerted on the adjacent pole can also cause it to break, and that is what we're referring to as cascading.

Q And this was a very big problem in Wilma, wasn't it?

A It accounted for a large percentage of the broken poles, yes.

Q 85 percent?

A Roughly 80, 85 percent, yes.

Q Now have you been able to determine why if one pole fails, whether it be due to wind, tree or debris, why the success of the pole or poles would fail in a cascading during your forensic analysis?

A We did not do a detailed analysis. But the, the theory is that, as I mentioned before, when one pole comes down, you still have your lines attached to it, so it's putting additional side loading on the poles that are adjacent to it, and that side loading is, represents more of a force than those poles can withstand.

Q And that could be if a tree falls on a conductor as

well as falling on the pole, that will pull the pole line over; is that right?

A If that was the cause of the initial pole failure, that could be true.

Q And that could start -- a tree falling could start a cascading event just as well that way; is that correct?

A Yes, it could.

Q Now as far as the cascading is concerned, did you also -- or did you make any forensic analysis as to what stopped the cascading? Because presumably it wasn't dominos all the way back to a substation. It stopped at some point.

A Unfortunately we did not do that this time. Next time we will.

Q You didn't make any observations that either a junction pole or a storm guyed pole or some other reinforced pole managed to stop the cascading?

A No, we did not.

Q Do you think that that would be an important determination or analysis to perform in, as part of your Storm Hardening Plan?

A I agree it would certainly be a great data point. And as I mentioned, that's why next time around we will do that.

MR. SEIVER: I have no further questions. Thank you.

CHAIRMAN EDGAR: Thank you. And any other questions

on cross? Mr. Wright, did you have questions on cross?

MR. WRIGHT: No, ma'am.

CHAIRMAN EDGAR: Okay. Thank you. Thank you. No questions from staff.

MS. FLEMING: No questions.

CHAIRMAN EDGAR: Commissioners?

Mr. Butler.

MR. BUTLER: Let me check just one second to see if I have any redirect.

CHAIRMAN EDGAR: Sure.

MR. BUTLER: No redirect. Thank you.

CHAIRMAN EDGAR: No redirect. Okay. And I believe we have one exhibit.

MR. BUTLER: Are we ready for moving exhibits?

CHAIRMAN EDGAR: I think we are.

MR. BUTLER: I guess the only one that I would have to move is Exhibit 53, the list of the proposed revisions.

CHAIRMAN EDGAR: And seeing no objection, we will enter Exhibit 53 into the record for this docket.

(Exhibit 53 admitted into the record.)

And the witness is excused.

MR. BUTLER: Thank you.

CHAIRMAN EDGAR: Thank you.

MR. BUTLER: Should we call our next witness, or do you want to take a break at this point?

CHAIRMAN EDGAR: Is everybody okay? We're ready.

MR. BUTLER: I would call Mr. Miranda.

While he's coming to the stand, I would note that the second page in what I had handed out we discussed earlier were changes to Mr. Miranda's testimony, the similar issue of withdrawals related to stipulations and associated withdrawals that we have reached.

CHAIRMAN EDGAR: Should we go ahead and number this?

MR. BUTLER: I would ask that that be identified as Exhibit 54.

CHAIRMAN EDGAR: Yes, we will identify it as Exhibit 54, titled Proposed Revisions to FPL's Rebuttal Testimony, Witness Miranda.

(Exhibit 54 marked for identification.)

MR. BUTLER: That's right.

CHAIRMAN EDGAR: And, again, to make sure that the court reporter has a copy.

MR. BUTLER: Thank you.

MANUEL B. MIRANDA

was called as a witness on behalf of Florida Power and Light Company, and having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. BUTLER:

Q Mr. Miranda, you have previously been sworn, correct?

A Yes, I have.

Q Would you please state your name and business address for the record.

A Sure.

It's Manuel B. Miranda. My business address is 9250 West Flagler Street, Miami, Florida, 33174.

Q Thank you. Can you lean a little bit closer to microphone? It seemed like it wasn't picking you up very well.

A That's as close as I can get, John. (Laughter.)

Q Okay.

A I'll speak louder.

Q All right. There you go. That's a good solution.

Do you have before you a document entitled Rebuttal Testimony of Manuel B. Miranda, dated September 14, 2007, consisting of 20 pages and three attached exhibits?

A Yes, I do.

Q And was this document prepared under your direction, supervision, and control?

A Yes, it was.

Q With the changes that have been identified on Exhibit 54, do you adopt this as your rebuttal testimony in this proceeding?

A Yes.

MR. BUTLER: And I would note that Mr. Miranda's attached Exhibits MBM-4, 5, and 6 are numbered 41, 42,

43 respectively in Exhibit 1.

CHAIRMAN EDGAR: Just a moment. Okay. I'm there with you. Exhibits 41, 42, and 43. Thank you.

(Exhibits 41, 42 and 43 marked for identification.)

MR. BUTLER: And I would ask that Mr. Miranda's prefiled rebuttal testimony, as revised by the revisions shown on Exhibit 54, be inserted into the record as though read.

CHAIRMAN EDGAR: Thank you.

The prefiled rebuttal testimony of this witness will be entered into the record as though read reflecting the revisions in Exhibit 54.

MR. BUTLER: Thank you.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

REBUTTAL TESTIMONY OF MANUEL B. MIRANDA

DOCKET NO. 070301-EI

SEPTEMBER 14, 2007

Q. Please state your name and business address.

A. My name is Manuel B. Miranda. My business address is 9250 W. Flagler St., Miami, Florida 33174.

Q. Did you previously submit direct testimony in this proceeding?

A. Yes.

Q. Are you sponsoring any exhibits as part of your rebuttal testimony?

A. Yes. I am sponsoring the following three exhibits:

- MBM-4, 2007 Aerial Maps & Engineering Drawings for 2007 CIF and Community Projects;
- MBM-5, Balance of 2007 Engineering Drawings for 2007 CIF and Community Projects;
- MBM-6, Primary Map Drawings for 2008 and 2009 CIF Projects.

Q. What is the purpose of your rebuttal testimony?

A. I will respond to the portions of the testimony submitted on behalf of ~~Verizon Florida LLC by Lawrence M. Slavin and Sanford C. Walker as well as~~ Michael T. Harrelson on behalf of Florida Cable Telecommunications Association, Inc. (FCTA) that relate to their objections to FPL's plan to apply

extreme wind loading criteria (EWL) to its distribution facilities. Additionally, I will respond to the portions of the testimony of Mr. Harrelson regarding his contentions that FPL has not submitted all information required by Rule 25-6.0342(4), F.A.C., ~~that FPL's attachment standards are not reasonably practicable as required by Rule 2506.0342(5), F.A.C~~., and that FPL has not fully satisfied its obligation to seek and attempt in good faith to accommodate concerns of third party attachers.

Background on FPL's Storm Hardening Plan

Q. The testimonies of the Verizon and FCTA witnesses express concern regarding the need for and cost of FPL's plan to apply EWL within its service territory. Please describe the background that led FPL to propose the application of EWL within its 3 prong storm hardening approach.

A. The 2004 and 2005 hurricane seasons were the most extraordinary and challenging on record for FPL and its customers. Seven storms, including five direct landfalls within FPL's service territory, resulted in a very large number of customer outages, with those outages extending for many days and even weeks in some cases. Customers made it clear that the scope and duration of these storm outages, and the disruption to the recovery and normal functioning of their communities that the outages entailed, were unacceptable. At the same time, FPL and this Commission recognized that, without significant changes in the way we construct and operate our infrastructure to prevent outages, the level of disruptions to our system as well as to our customers in future storms would be much like that experienced in 2004 and 2005.

Accordingly, FPL and this Commission concluded that significant changes were needed. FPL announced its Storm Secure initiative in January 2006, and the Commission also began to roll out its own initiatives (e.g., mandating pole inspections programs, requiring development of storm preparedness initiatives and initiating hardening rulemaking dockets). In early 2007, the Commission finalized its hardening rules, and specifically Rule 25-6.0342, requiring all IOUs to file hardening plans by May 7, 2007.

To comply with this rule, FPL filed its Electric Infrastructure Storm Hardening Plan (Plan), which contained a 3 prong approach to harden its distribution system: (1) EWL; (2) Incremental Hardening; and (3) Design Guidelines. EWL would be applied to existing and new feeders serving CIF and certain poles critical to operations and efficient restoration. Incremental Hardening, hardening existing feeders, up to and including EWL, would focus on community projects (facilities serving essential community needs such as grocery stores and gas stations). FPL's Design Guidelines contained criteria to apply EWL to the design/construction of all new overhead facilities, major planned work, relocation projects, as well as daily work activities.

The 2004 and 2005 storm experiences, the performance of FPL's transmission structures (which were already built to EWL standards and performed well during the 2004 and 2005 storm seasons), and most importantly, the forensic data from Hurricane Wilma, serve as the basis for FPL's Plan. FPL found that,

in Hurricane Wilma, "wind only" was the predominant root cause of distribution pole breakage. This was a fact that FPL could not ignore. Other initiatives, e.g., pole inspections and increasing vegetation trimming, were addressing all other major causes of pole breakage, but none of them addressed the "wind only" failures that had been so prevalent in Hurricane Wilma. FPL's Plan addresses that last major cause of pole failure.

FPL's Plan includes the associated estimated costs for 2007-2009 as well as estimated benefits that can be expected. FPL recognizes that implementing the Plan will be expensive, as one would expect when the goal is to harden an electric infrastructure as expansive as ours. But these expenditures are important, because only by implementing the Plan will FPL directly address the problem of "wind only" pole failures. FPL believes that this is what our customers expect. As discussed in my direct testimony, implementation of the Plan should provide substantial benefits to our customers, including fewer outages, reduced restoration time, quicker return of essential community services, as well as day-to-day reliability and is, therefore, in the best interest of our customers. Most of those benefits will work to the advantage of the third parties that attach their facilities to FPL's poles as well.

Responses to Specific Points Made By Intervenor Witnesses

Q. **Do you agree with Mr. Harrelson's claim that FPL's plan is not prudent, practical or cost effective because it will dramatically increase costs without adequate assurance of a commensurate improvement in storm performance or storm restoration?**

A. No. First, Mr. Harrelson uses only the top of the range for each of the years 2007-2009 which exaggerates FPL's 3 year hardening cost estimates. Using the low end of the range for these years would result in a 34% reduction from the figures Mr. Harrelson cites.

Interestingly, Mr. Harrelson compares FPL's projected storm hardening expenditures to TECO's, making the point that FPL's projected costs are approximately five times larger on an overall basis. However, given the differences in size between FPL and TECO, this is clearly not a valid comparison. FPL's service territory covers almost 28,000 square miles compared to approximately 2,000 square miles for TECO – 14 times larger. And FPL has over 4.3 million customers compared to approximately 650,000 for TECO – over six and one half times as many. Given these differences in size, FPL's overall projected hardening expenditures under the Plan are quite reasonable – in fact, relatively modest -- in comparison to TECO's.

Regarding the benefits of FPL's Plan, Mr. Harrelson's position is again based on skewing the data in favor of his position. Whereas his evaluation of the

Plan's cost focused on the *high* end of the range, when he talks about the benefits, he focuses on the *low* end of FPL's restoration cost savings per mile of hardened feeder. Mr. Harrelson is right that FPL cannot guarantee that the benefits associated with storm restoration performance or costs will be achieved. As I discussed in my direct testimony, there are several factors that affect the amount of actual restoration cost savings, including the frequency of storms impacting FPL's service territory, the intensity of these storms, and reductions in storm hardening costs associated with improvements in construction processes or technological advancements. At this time, it is impossible for FPL or anyone else to predict the outcome on any of those factors. However, as I noted previously, the experience of the 2004-2005 hurricane seasons as well as some recent meteorological analyses suggest that more frequent storm activity may be more representative than the assumption used in FPL's restoration cost savings analysis of a storm every three years. Also, a Hurricane Wilma event occurring once every 3 years will result in restoration cost savings becoming approximately equal to hardening costs.

It is important for this Commission to keep the benefit-cost evaluation in perspective. FPL's Plan, and the Commission's rule requiring such plans, were not motivated strictly by a benefit-cost calculus; as I discussed earlier, they are responding to a strong public outcry after the 2004 and 2005 storm seasons concerning the disruptions caused by widespread and lengthy outages. FPL is well aware that only limited information is available at this time to

evaluate the benefits of storm hardening, but does not believe that the public's strong interest in reducing those disruptions would be well served by doing nothing (or doing only minimal, pilot projects) until complete information is ultimately available at some point in the indefinite future.

Q. Mr. Harrelson and Dr. Slavin assert that FPL should not adopt EWL for distribution facilities because the NESC Committee has rejected it and because none of the other Florida IOUs "embrace the EWL standard as FPL has done". How do you respond to these assertions?

A. FPL is not unsympathetic to the position taken by the NESC Committee as well as the other Florida IOUs. It is the same position taken by FPL until Hurricane Wilma, the seventh storm to impact us over a 15-month period. Again, however, FPL cannot ignore the results of its Hurricane Wilma forensic data, which showed "wind only" being the predominant cause for pole breakage. Nor can FPL ignore the expectations of its customers and others to improve the storm performance of FPL's electrical infrastructure.

Q. Mr. Harrelson believes that FPL's deployment plans, do not comply with Rule 25-6.0342(a)-(e), F.A.C. Do you agree with this conclusion?

A. No. As I stated in my direct testimony, FPL's hardening and deployment plans are in compliance with the requirements of Rule 25-6.0342.

Q. Mr. Harrelson faults FPL for not limiting its application of EWL to coastal areas. Is this a valid criticism of the approach to EWL hardening in FPL's Plan?

A. No. While FPL's Plan will apply EWL system-wide, it differentiates the application based on three EWL wind zone areas. These wind zone areas generally result in the highest wind-speed designs being used in the southeastern portions of FPL's service territory, where history has shown that the risk of severe storms is the greatest. In contrast, the more northerly and inland portions of FPL's system generally will have lower wind-speed designs for EWL hardening, reflecting the somewhat lower risk of severe storms in those areas.

Furthermore, it is important to recognize that FPL's Hurricane Wilma forensic data does not support the theory that non-coastal areas and sheltered areas will not be exposed to strong storm winds. Hurricane Wilma struck FPL's territory on the west coast of Florida; however, most of the damage, and certainly the most severe damage, occurred on the southeast portion of FPL's territory, after the hurricane had traveled inland across the southern portion of FPL's territory. Additionally, with large storms like Hurricanes Frances and Jeanne in 2004 and more intense storms like Hurricane Charley, my experience is that there is no defining line to suggest limiting the application of EWL to just coastal areas.

Q. **~~Both Messrs.~~ Mr. Harrelson ~~and Walker~~ suggest that FPL has not provided adequate descriptions of the communities and areas where improvements are to be made, description of the extent to which joint use facilities are involved, and estimates of costs and benefits to the utility. Has FPL provided this information?**

A. Yes. This is especially true for 2007. FPL provided a listing of all CIF and incremental hardening projects, including the county in which they are located. Additionally, FPL provided to all interested parties detailed engineering drawings for each of these CIF and incremental hardening projects. These detailed engineering drawings provide information that includes the location of the route, poles requiring replacement, and where new intermediate poles will be set. At the various workshops, as well as discussions with individual companies, FPL has requested and all parties have confirmed that for 2007, all information related to the 2007 projects has been provided.

Since the time that Rule 25-6.0342 was proposed by the Commission in its current form, FPL has repeatedly made it clear that it was not going to be able to provide the same level of detail for the two "out years," in this case, 2008 and 2009, because its internal budget process would not be completed for those years at the time that each three-year hardening plan is initially filed. FPL has always expected that it would have to provide updated information on an annual basis, and, in fact, the rule provides for that option.

In spite of the limitations, however, FPL has worked hard to provide as much information on 2008 and 2009 projects as quickly as possible. I provided a listing of the 2008 and 2009 CIF projects in Exhibit MBM-2 to my direct testimony. Additionally, in August 2007 FPL provided to all of the intervenors, including ~~Verizon and~~ FCTA, a CD showing the route for each of these projects. This information should be more than sufficient for all of the intervenors, including ~~Verizon and~~ FCTA, to form an opinion on the appropriateness of the 2008-2009 CIF projects.

Furthermore, while it is true that the precise details of how these projects will be designed and constructed has yet to be provided, FPL, ~~Verizon,~~ FCTA and all other parties to this docket have agreed upon a process to provide updated information for 2008 and 2009. This process is spelled out in Exhibit KS-1 to the testimony of AT&T Florida witness Kirk Smith. With one revision that has been requested by the Commission Staff, FPL supports this process and asks that the Commission approve it as part of the final order in this docket. The Staff revision is to provide for the annual status report on hardening plans to be filed "with the Director of Division of Economic Regulation" rather than with "the Commission." FPL understands that all of the parties to this docket support Staff's revision.

Q. ~~Both Dr. Slavin and~~ Mr. Harrelson suggest that the Davies Consulting Storm Pole Replacement analysis provides inconclusive support for substantiating that systems designed to withstand stronger winds have greater overall resiliency in storms. Do you agree?

A. No. On its face, the relationship between the two curves represented on Exhibit MBM-3 to my direct testimony clearly indicates that FPL's Grade B poles consistently performed better than Grade C poles in storm conditions. The only identified variable that differs between the electric systems whose storm experience is reflected in these curves is the grade of construction. Neither of the intervenor witnesses offers any speculation and a recommendation for further investigation in response. Therefore, I see no reason to adjust my earlier conclusion about the Davies Consulting analysis - it shows that a higher grade of construction will provide greater overall storm resiliency.

Q. Has FPL provided as part of its Plan any estimates of the costs and benefits to third party attachers?

A. Yes, to the extent the attachers have provided estimates of their costs and benefits, FPL has included that information in its filing. However, where attachers have provided no input, FPL has not been able to include cost and benefit information for those attachers in the Plan. FPL is not in a position to estimate the costs and benefits of the Plan to attachers, as that information is much more in their control than ours.

In regard to FCTA, I would like to point out that FPL has provided: (1) detailed engineering drawings for the 2007 CIF and community projects indicating the work to be completed on each feeder; (2) the total number of poles to be replaced (2,100) and number of intermediate poles to be installed (700) in 2007; (3) when it expects FCTA will be required to reimburse FPL for make-ready work; and (4) an estimate of the pole rental rate computed using 2007 estimated hardening cost estimates (which indicated a 2% increase). FCTA has enough information to provide 2007 cost estimates and benefits; however, they have yet to do so.

Q. Do you agree with Mr. Harrelson that FPL's hardening plans will cause cable operators to incur significant additional costs?

A. No. FPL is only replacing approximately 2,100 poles and installing 700 new intermediate poles system-wide in 2007, compared to a total distribution pole population of 1.1 million. While all the details for 2008 and 2009 have not been finalized, costs associated with pole replacements and new intermediate poles are expected to increase. However, again, FPL does not expect the impact on cable operators to be significant. Also, to the extent possible, it is in FPL's best interests, as well as attachers, for FPL to set new replacement and intermediate poles "in line," thereby minimizing splicing and new cable costs. Taking these factors into consideration, as well as the estimated minimal impact of FPL's hardening projects on the annual pole rental rate for 2007, it is not clear to me how Mr. Harrelson has determined that the cost impacts to cable operators are significant.

Q. Mr. Harrelson ~~and Dr. Slavin~~ suggest that FPL's hardening plan may actually adversely impact the distribution system's ability to withstand extreme weather and hinder storm restoration, e.g., adding more poles and more poles under or near tall tree canopies, the lack of availability of larger poles in a restoration event, foreign crews' inability to set concrete poles, and more and stronger poles possibly failing due to trees and tornados creating more hazards for motorists. Do you agree that their suggestions of adverse effects are plausible?

A. No. Their suggestions are speculative, and they have provided no evidence in support of their statements. First, FPL expects that its increased vegetation trimming will significantly reduce the number of instances in which poles will be damaged by falling trees or limbs. Additionally, FPL expects that the stronger poles will better withstand falling tree limbs when they do occur, as well as damage from flying debris. As to the claim that stronger poles will pose hazards for motorists, all FPL poles are properly permitted with the appropriate agencies and meet or exceed all safety requirements. Finally, there is no reason to expect that FPL's restoration activities will be negatively impacted by the use of more and stronger poles. FPL is recognized as leader and expert in storm restoration activities. Specialized equipment, e.g., airboats, barges, large cranes, and "moon walkers," is readily available to FPL as well as foreign crews to address any extraordinary needs, including installing concrete poles. Nor would restoration efforts be delayed as a result

of any larger pole or concrete pole shortages as FPL has and will continue to use all available pole inventory to restore service as quickly as possible.

Q. Mr. Harrelson suggests other alternatives to strengthen FPL's system that he says should be pursued in lieu of building to EWL. These include replacing poles that do not meet current construction standards, replacing small wire, providing better access to inaccessible facilities, using specialized equipment for storm restoration efforts, strengthening or replacing guys, adding equipment to improve line segment sectionalizing, and converting system voltages to 25kV. Is FPL pursuing any of these alternatives?

A. Yes. In fact, FPL has in place most of Mr. Harrelson's suggestions, including: FPL's 8-year pole inspection program; FPL's model feeder program; installation of automated feeder switches to improve line sectionalizing capabilities; and utilizing special equipment as I previously discussed in storm restoration activities. These activities are properly being pursued in addition to, not in lieu of, FPL's Plan. Continuation of the same processes and programs that have already been in place will not provide the step change in storm hardening that our customers are seeking.

~~Q. What do FPL's third party attachment standards and procedures require in terms of pole loading analysis prior to new attachments?~~

~~A. The standards require that each pole be evaluated~~

Q. In the middle of p. 38, Mr. Harrelson paraphrases FPL's loading analysis requirements for new attachments as follows: "In other words, FPL is saying that the analysis can be performed on the worst case pole in a given string of poles having similar characteristics." Is this an accurate characterization?

A. No. The Permit Application Process Manual (Manual) referenced by Mr. Harrelson, when read in its entirety, requires a load assessment for each pole. For example, in the section of the Manual addressing non-make ready permit applications for new attachments and overlashing, part of the package required for submittal includes "Wind load sheets for each pole applied for." Moreover, the very page of the Manual referenced in Mr. Harrelson's testimony states: "The goal of the wind load calculations is to know that all the parties have sufficient strength for the proposed attachments".

Q. Are any of the third party attachment standards and procedures to which Mr. Harrelson objects new to the FPL Plan?

A. No. These are the same standards and procedures we have been using for a number of years prior to this docket.

Q. Do you understand why Mr. Harrelson has chosen this time to object to FPL's overlashing requirements?

A. No. These are the same requirements that have been in place since the mid-1990's and FPL cannot recall any negative feedback regarding these requirements.

Q. Do you agree with Mr. Harrelson's testimony at pp. 39-40 that power lines and electric facilities have a greater impact on pole loading than third party attachments or overlashing?

A. His statement is literally true, but the difference is that the pole lines were engineered in the first instance to support the power lines and electric facilities. FPL does not systematically engineer its system on the front end to accommodate untold numbers of third party attachments and overlashings.

Q. Is FPL amenable to Mr. Harrelson's "alternative" overlashing proposal (at p. 41) which would require a load assessment within 30 days *after* the overlashing is made?

A. No. There are at least two reasons. First, there is no convincing reason to change the way FPL has been requiring load assessments (without objection) for 10+ years. Second, Mr. Harrelson's "violate now and fix later" approach would practically be condoning, if not inviting, NESC violations. This is unacceptable from FPL's perspective.

Q. Do you agree with Mr. Harrelson's testimony at p. 43 that third party attachments can have a "beneficial effect on the stability of the pole or ability to withstand wind and other forces"?

A. There are some limited circumstances where this can happen, but those circumstances are the exception to the general rule.

Q. On page 8 of his testimony, Mr. Harrelson provides a "yes and no" answer to a question that asks if FPL sought input from third party attachers and attempted in good faith to accommodate concerns raised by third party attachers. Has FPL sought input from attachers and attempted in good faith to accommodate their concerns?

A. Yes. I believe FPL has gone out of its way on the both of these issues. I personally have conducted meetings with all attachers, first in a joint meeting held at FPL's offices in April 2007 (which FCTA attended) as well as individually meeting with all interested parties (including FCTA). Additionally, I personally attended all but one of the FPSC workshops held in conjunction with this proceeding, where various issues were repeatedly discussed, both formally during the workshop as well as well as informally during breaks and before/after each workshop. To the extent that FPL has had details available on its EWL CIF and community projects, those details have been made available to all interested parties as promptly as possible. This includes providing CDs of data over the April – August 2007 period that contained the available engineering information. Those CDs are Exhibits MBM-4 through MBM-6 to my rebuttal testimony.

Specifically, Exhibit MBM-4 contains the aerial maps and available detailed engineering drawings for all 2007 EWL CIF and community hardening projects. This information was provided to all interested parties in April 2007. Exhibit MBM-5, which was provided in a CD to all interested parties in

August 2007, contains the detailed engineering drawings for all 2007 EWL CIF and community projects that were not available in April 2007. Finally, Exhibit MBM-6 contains the primary map drawings for all EWL CIF projects to be completed in 2008 and 2009.

FPL has also worked very hard to respond to concerns about the Plan raised by the attachers. Frankly, I am surprised that Mr. Harrelson would suggest otherwise, after the numerous discussions that I and others at FPL have had with him. For example, Mr. Harrelson's testimony complains that FPL has not modified the "hardening tools" that we use to implement the Plan so that the guying effect of cables and other facilities would be taken into account. FPL has asked Mr. Harrelson on multiple occasions, beginning about 6 months ago, to point us to any information of which he is aware that would provide a quantitative basis for FPL to evaluate and consider these guying effects. Unfortunately, he provided no such information until FCTA served responses to FPL discovery this week, just three days before rebuttal testimony was due. None the less, Mr. McEvoy includes some initial thoughts on this information in his testimony.

Q. Mr. Harrelson suggests that if the Commission is going to approve the application of EWL to distribution facilities it should be done on a limited "trial" or pilot project basis. What is your reaction?

A. I believe FPL's Plan, as well as the other storm hardening and preparedness initiatives in place, provide the foundation for improving the storm resiliency

of FPL's system. This is not just a trial or pilot program -- FPL believes its customers want results, not just research.

At the same time, the Commission should keep in mind that implementing the Plan system-wide will be a long-term endeavor. FPL's system is very diverse and geographically large. Its overhead system consists of over 41,000 miles, includes approximately 3,000 feeders and it contains over 1.1 million poles. In 2007, FPL's Plan results in: approximately 145 miles either EWL or incrementally hardened (CIF and community projects); 38 feeders EWL hardened (CIF) and 34 feeders incrementally hardened (community projects), and approximately 2,100 poles replaced and 700 new intermediate poles installed. While the 2008 and 2009 projects are not finalized at this time, it appears that the number of CIF projects completed will be increasing in these 2 years, in order to complete all CIF projects within the next 6-8 years. As can be seen by the 2007 results, fully hardening the infrastructure will take time, effort and commitment from all involved. Approving this Plan is not a final and one time action. As additional storm experience, more and better data, new improved processes, and better products and materials, e.g., composite poles, become available, more cost-effective hardening solutions will be able to be implemented. The requirements in Rule 25-6.0342 for on-going submittal and review of hardening plans, as well as the process for updating and reviewing annual plans that has been agreed to by all parties, provides the process for these plans to be appropriately monitored.

Approval of FPL's Plan for the 2007-2009 time period is a first step, in which FPL and its customers, the Commission and third-party attachers can begin to see the benefits of hardening. At the end of that time period, there will be an opportunity for everyone involved to evaluate those benefits. FPL fully expects that the techniques and approach to implementing hardening will change over time. Thus, this first three-year Plan will create a base of hardened facilities and give FPL's customers a solid start toward achieving the added storm resilience that they have clearly indicated they want.

Q. Does this conclude your rebuttal testimony?

A. Yes.

BY MR. BUTLER:

Q Mr. Miranda, would you please summarize your rebuttal testimony?

A Yes, thank you.

Good afternoon, Commissioners.

My rebuttal testimony addresses the testimony submitted by Michael T. Harrelson on behalf of FCTA. Specifically, I address his concerns with costs by demonstrating that FPL's costs are quite reasonable, that FPL's plan would not adversely affect the system's resiliency as he suggests, and there is no basis to limit wind to coastal areas.

Finally, I disagree with his suggestion that if the application of the extreme wind is approved it should be done on a trial or pilot basis. This approach does not respond to our customers' needs. Other initiatives approved by the Commission, for example, pole inspections and the ten storm preparedness initiatives, including increased vegetation management, are addressing other major causes of pole breakage, but none of them address the problem of wind-only pole failures. FPL's plan addresses this issue.

Implementation of our plan should provide substantial benefits to our customers including fewer outages, reduced restoration time, quicker return of essential community services, as well as day-to-day reliability. It's important to recognize that approving FPL's plan is not a final

once-and-for-all decision. FPL's territory is very diverse and geographically large. Fully hardening the infrastructure will take time. More storm experience and proved processes, better products and materials, for example, composite poles, as well as continuing collaborative processes for updating and reviewing future hardening plans will allow for the review, evaluation, and implementation of more cost-effective hardening solutions as they emerge.

The time is now. FPL's first three-year plan will create a base of hardened facilities and give today's customers as well as future generations a solid start toward achieving the added storm resilience that they have clearly indicated they want. Thank you.

MR. BUTLER: I tender Mr. Miranda for cross-examination. Thank you.

CHAIRMAN EDGAR: Questions on cross?

MR. SEIVER: Yes, I have a few. Thank you, Madam Chair.

CROSS EXAMINATION

BY MR. SEIVER:

Q Good afternoon, Mr. Miranda.

A Good afternoon, Mr. Seiver.

Q In your rebuttal testimony, do you have that handy?

A Yes, sir.

Q On Page 7 there's a question about the NESC committee

rejecting it, rejecting the extreme wind loading standard for distribution facilities. And do you see your answer in Line 9 that says, "FPL is not unsympathetic to the position taken by the NESC committee as well as the other Florida IOUs." What did you mean by the position taken by the NESC committee?

A Well, the position that they would not -- the 60-foot exemption issue, and that we understood why that decision was made.

Q What was your understanding as to why the decision was made by the NESC committee?

A I am not a member of the NESC, but in general I think the main driver was that many of the members felt that debris and tree-related outages were the major causes of outages during the hurricane.

Q And does that have anything to do with the height of the pole as compared to the height of trees?

A That was part of their decision-making. And, again, not until we had the forensics of Hurricane Wilma did we change our position and have a better understanding of the wind-only component.

Q And as far as you know, poles taller than 60 feet are rarely distribution poles, right?

A Well, I wouldn't say rarely. There is more and more highway crossings, and you have these taller poles that are getting -- and then you have the limited highway, you know,

like waterways. So, I don't know if they are rare as you would describe it, but they are the smaller proportion to the general population of distribution poles.

Q Well, the NESC does require extreme wind in those locations that you just mentioned, doesn't it?

A That's correct.

Q And FPL has been doing it?

A It requires Grade B construction.

Q I'm sorry, it requires Grade B.

A Correct.

Q So we're clear, Grade C and Grade B are different standards of construction, is that right?

A That's correct.

Q And can you just summarize quickly before I move on what the difference is between Grade C and Grade B?

A In what aspect are you asking, I'm sorry?

Q Well, for example, the code does require, you just said Grade B at highway crossings and waterways, and what exactly is different about Grade B versus traditional Grade C distribution pole construction?

A The main difference, of course, is the issue of the wind profile. So, Grade C, for example, just has a lower wind rating when you design for it versus Grade B.

Q In order to turn a Grade C construction, for example, into Grade B, what would be the traditional methods or ways of

making it Grade B?

A Can you clarify? Are you asking about the construction method?

Q Yes, exactly.

A Typical construction methods would be you would either have shorter spans within your pole distance, you can have bigger class poles, you can look at the equipment that you set on your facilities, you could look at the framing of the pole. So there is multiple ways of achieving Grade B construction from Grade C construction.

Q So it would be fair to say that in order to move from Grade C to Grade B you could add intermediate poles to shorten the spans, is that right?

A If it is an existing line.

Q Existing line, yes.

A Yes, if it's an existing line, again, you could look at multiple ways of achieving it. You can look at, as Mr. Harrelson has pointed out, you can look at guying, you can look at intermediate poles, you could look at bigger class wood poles, and just move along a tool kit, if you will, of different applications that you can apply to achieve the higher wind loading.

Q And correct me if I'm wrong, I know you were here for Mr. McEvoy's testimony, but didn't you testify earlier that you are looking into the considerations of the guying effect of

lateral lines of the power conductors and the communications lines themselves, is that right?

A Yes. That has been brought forward as a suggestion, and as I think we have shared with FCTA, we don't -- and as Mr. McEvoy clarified, just how to calculate that exact effect of the guying effect is really where we need to figure out. For example, if a conductor is slack, it's very different if you pull that tension. How you bolt it to a pole. All of those components have to be calculated, and it needs to be in a way that is done by the design formulas so that you can truly account. If we can, you know, calculate this, it clearly is something we want to incorporate into our tool kit because it can help us in our hardening initiatives.

Q So it would be possible that poles that may have been constructed to Grade C, for example, may actually be at Grade B strength once you consider the guying effects of lateral lines?

A If it can take it all the way up to that level. I mean, there may be times that that exists, but, again, we have to figure out how to calculate that, you know, from a good sound engineering practice.

Q And now moving from Grade B, extreme wind, you could apply extreme wind to Grade C as well as to Grade B, could you not?

A You can make any jump that you want along the construction.

Q And to take into account the extreme wind, could you also use these same construction methods for existing lines that I mentioned of either putting in intermediate poles, or additional guys, or storm guys, or framing, looking at the equipment, all of those?

A Yes, sir.

Q That would all be available. You wouldn't necessarily have to go to a larger class. I guess it's a lower number, but a thicker pole or to a concrete pole?

A Right.

Q In your testimony you also discuss on this same Page 7 about Hurricane Wilma, and I think you characterize it as the seventh storm to impact you over a 15-month period, and I think had we discussed before that Wilma was a unique storm in FPL's history?

A Again, I think we had this discussion late yesterday, where, you know, I wouldn't classify Wilma as a unique storm, per se, in that it was a Category 3 storm that impacted our service territory. If you look at the history of the number of hurricanes that impact Florida's territory, I wouldn't classify that event as being necessarily unique.

Q But it was unique that it showed wind only as being the predominant cause for pole breakage?

A Well, I think it's wind only because we had some very good forensics that were conducted by Mr. McEvoy's team in

which the causes of the pole breakage was identified. And as he shared, it is probably the best analysis that has been put together in the nation to try to understand what happens after a hurricane.

Q And that analysis is included in the KEMA report, that forensic analysis, is that right?

A The forensics data was provided to KEMA in which they compiled their analysis off of.

Q We have talked about that and that is in the report?

A Correct.

Q As far as the forensic analysis, I believe you stated in your summary, and you have stated that it does not support a theory that noncoastal areas and sheltered areas would be inappropriate for extreme wind consideration. Is it your understanding that if you build a pole line to extreme wind and it's below the tree line, that a tree blown down in a hurricane wind will take an extreme wind pole line down with it, is that right?

MR. BUTLER: I'm sorry, did you say will?

MR. SEIVER: Yes.

MR. BUTLER: Okay. So you are asking the question absolutely will?

MR. SEIVER: Yes.

THE WITNESS: I don't think it's a will automatically. If you look at these steps that we're taking to

harden our infrastructure, it really is across many facets. We are looking at building it to extreme wind, we are looking at upgrading our conductor size to replacing that small wire that we have had some discussions, Mr. Harrelson had some discussions earlier on. We also conduct tree trimming, we inspect the poles, and, as you know, we are also doing more vegetation trimming.

So, our goal is to try to eliminate that outage from occurring at all, and if there is some tree breakage, I would hope in some cases it is going to be more resilient and can mitigate some of that damage that we maybe we would have seen in the past.

BY MR. SEIVER:

Q Would it be fair to say that at least the NESC's subcommittee doesn't agree with your position?

A Again, I don't have that level of detail.

Q I also wanted to ask you about the expense of an extreme wind construction project in the event there is damage, and I believe I established with Mr. McEvoy that concrete poles came down, I guess Grade B poles, Grade C, everything came down in Wilma. Is it more expensive to replace poles and to restore service where you have extreme wind construction in place?

A Again, you know, first of all, we expect to have fewer poles fail during an event following an extreme win. And I know that we have had this discussion several times about

what happens after a storm if you are building to extreme wind, and what you look at is we expect a lower failure rate to occur which in the end results in a net reduction of total pole failures that have failed during a storm.

So, you know, again, one of things I was trying to figure out is how to kind of demonstrate this that is constant. One of the things, Mr. Seiver, I was thinking about was, for example, if you look at -- if you took a million poles, let's say, as a composite, right, and if you remember my MBM exhibit where we had the Grade C relationship curve and then the Grade B relationship curve, and if you look at that curve, you look at Hurricane Wilma, where Hurricane Wilma occurred, FPL experienced about a 1-1/2 percent pole failure rate when it was exposed. So, let's say we apply that 1-1/2 percent to the million poles. So we would expect 15,000 poles to fail if all one million poles had hurricane exposure.

If you go up that curve on my exhibit, and you get to the Grade C construction, we could have seen about a 2-1/2 to 3 percent pole failure rate. So you would have said you could have seen 25 to 30,000 poles had we been building to Grade C construction. So, of course, the delta -- coincidentally, too, is Grade B is about 50 percent stronger than Grade C construction from a strength perspective.

So when you look at extreme wind, which is where we're looking to move towards, and you apply, you know, right

now extreme winds is about 94 percent stronger than Grade B, so just applying that percentage we would look at a pole failure rate of, let's say, about .75 as an example. If you apply that .75 to the one million, that would be 7,500 poles. So just to kind of recap, you have 25 to 30,000, 15,000 on the current, and then 7,500. And I think the issue that keeps coming up, but FPL, you are going to add more poles back into the system, extreme wind requires more intermediate poles and so forth.

So if you add -- you know, and I just took it as an example of 10 percent. You add 100,000 more poles back into the system, so you do 1.1 million poles, apply the .75 percent, that's 8,250 poles. And my point is it is still significantly lower than what we see from 15,000 to 8,250. So, yes, it does account that you would have more poles fail, right, but, nowhere near, right, what you would expect from staying with the same construction framing.

Q Mr. Miranda, I presume you are referring to the Davies Consulting graphs?

A Correct.

Q In those we talked about the different utilities and you identified them, and no other Florida utilities, so we don't know whether those pole failures were related to wind only, or wind and trees, or deterioration, we just don't know?

A But the correlation is pretty good, and the intent of that exhibit was to show what you can expect as you move along

that curvature as the hurricanes progress through your territory.

Q And we don't have data comparing how Grade B or C faired in relation to extreme wind construction poles?

A Again --

Q There is no third line on that graph?

A And that's what we're hoping to build.

Q Because the NESC hasn't required it, nobody has built to that, is that right?

A Right. But as we move forward to the extreme wind, again, our foundation by which we are moving to extreme wind was based on our own experience during the 2004 and 2005 hurricane seasons. We asked KEMA to assist us with that analysis. We also looked at the performance of our transmission system. They are built to extreme wind. If you look at the percentage of pole failure versus, you know, their population was very low, and so those components along with the Davies that you mentioned are really the foundation by which we are recommending to move to extreme wind.

Q Well, just to make one point on that, the transmission towers and transmission poles are considerably taller than 60 feet, aren't they?

A Yes, they are taller than 60 feet as a general, but, again, they are built to the wind profile regardless of the height that they have.

Q But the height above trees is significant, isn't it?

A Again, on our forensics analysis we did identify that we did have pole breakage due to trees and pole breakage to debris. We are not ignoring those two components, and that's why we're doing more vegetation trimming, the pole inspection that we are doing on an eight-year cycle, which is, again, addressing those components that we're trying to address in our proposal to address the extreme wind, the wind-only profile that we saw.

Q And we had also talked about the restoration times. Am I correct in remembering that for certain poles that you might do temporary replacements as opposed to permanent replacements in order to get service back up if there was an extreme wind event and an extreme wind pole came down?

A First of all, again, we expect fewer outages. And as part of moving towards extreme wind, we have begun the process of eliminating all Class 5, Class 6 type wood poles, moving to having a much larger inventory of Class 3 and 2 wood poles, a larger inventory of concrete poles. So our goal would to be replace that pole with the immediate pole that's available. In the case where we don't have, you know, the exact pole for that location, let's say it's concrete and the immediate repair that has to be done is a wood pole, those are temporary measures that can be put in place, and that is a common practice. We have done that throughout our history in all of our storm

restoration. And as part of our storm follow-up work, we go back and sweep all areas and make sure that we put our system back to its pre-storm condition.

Q And does that require working on hot lines or do you have to do a temporary outage to do the transfers?

A It could be both. You know, our crews are trained to work on energized facilities. We can take planned outages, you know, those are common industry practices that we take. And, again, our goal would be to try to minimize that. And what we have done, again, is the inventory, and we have also put restoration guidelines that we have put together so that when foreign utilities come down, when contractors come down, they have a guideline that says here is how to rebuild back into our infrastructure.

MR. SEIVER: Thank you, Mr. Miranda. That's all I have.

CHAIRMAN EDGAR: Commissioner Argenziano.

COMMISSIONER ARGENZIANO: Just a couple of questions. If you were to -- first of all, what is the average easement when it comes to trimming for power companies?

THE WITNESS: You mean the clearance on the tree?

COMMISSIONER ARGENZIANO: Right.

THE WITNESS: It really varies by the tree type and the species.

COMMISSIONER ARGENZIANO: No, no. I'm sorry, I mean

your authority, your easement authority to go in. Is it 25 feet away from a power line, 30 feet? I mean, how far away from a power line can you go and cut down a tree?

THE WITNESS: Typically, we have to stay within our easement, which is typically about a ten-foot easement.

COMMISSIONER ARGENZIANO: Ten foot. Okay. So that brings me to my other question. So if there's a tree 20 feet away, and you can't cut that tree down, that tree is still a potential problem for those lines, would that be correct?

THE WITNESS: That's correct. If that tree is growing, let's say, into our lines, we will trim up to the easement, but many times we will work with those customers to give us the right to go back and to try to trim as far back as we can.

COMMISSIONER ARGENZIANO: My point being is that I think even outside of your easement there could be still problems from limbs and flying debris from that vegetation that you can't necessarily go out and cut, is that correct?

THE WITNESS: That's correct.

COMMISSIONER ARGENZIANO: And a second part to that just to try to put this altogether to figure out what's really the best things to do. If you were to upgrade C grade poles to B and add more along the way to kind of make it more stable, wouldn't that just mean more poles down or increasing to the cascading effect whether it is due to trees, or wind, or

whatever? And I'm sure there are other things that hit the line, also.

THE WITNESS: The way that we apply -- moving on our hardening ares practices, we have a tool kit that we will follow to try to minimize, one, the cost associated with it, but also taking actions along the way. So we would look at putting down-guys at some locations. In some cases we add intermediate poles, as you suggest. In other cases we just replace the existing pole with just a bigger, stronger pole. So, in those particular cases there would not be more poles to cascade, if you will. And as Mr. McEvoy shared with you, you know, the ability of these hardened facilities to take on maybe more branches in the future, we fully expect can make us more resilient against some of those impacts of those branch, if you will.

COMMISSIONER ARGENZIANO: And just one other on the vegetation, again, because I know how important it is to have proper clearing and to try to keep the lines clear, but I would think if your average easements are only ten feet, you would really still have a problem with trees and limbs and vegetation. Because I can't imagine that a tree 15 feet away doesn't cause the same type of damage in a real wind storm as one ten feet away. So is that still a potential problem for lines?

THE WITNESS: Yes. As we work through our vegetation

program, one of the things that we identified, of course, is we are increasing the amount of trimming that we are doing, as you said, within the easement and within right-of-ways. But one of the other big efforts that we are working with our community leaders is to try to look at saying how can we trim more lines.

And one of the things that we have found, Commissioner, is customers have become much for receptive to allowing us to trim following the '04 and '05 hurricane season. They, too, recognize that those trees caused some of the damage that we have seen. So they are giving us more and more opportunities to trim those trees, and we are asking our customers to also hire professional trimmers and remove some of those trees, which we are seeing more and more of, as all of our communities prepare for these hurricane seasons.

COMMISSIONER ARGENZIANO: And I hate to belabor it, but I'm trying to get to this point. I think, though, that even if you had a swath that you took care of and you from now on kept the trees and as many as far away as you can without taking all the trees and the landscape away, because then you would have the other outcome, many customers screaming at you for taking too many trees and branches down, but I still think there is still a problem with even if you kept your corridor, your ten-foot easement clear, you are still going to have problems from other trees and nearby trees that are just outside of the easement. That's still a potential problem.

Just because you are clearing your swath does not mean we are not going to have any more branches hit the lines and so on. There is a great deal to reduce that, but you are still going to have potential problems.

THE WITNESS: And I think we have always made it clear, no system is hurricane proof. But what we are doing is taking a big step forward to making it more resilient. And we really believe by going to extreme wind it will resist a lot more of those branches and debris that flies across some of these power lines.

COMMISSIONER ARGENZIANO: Okay. Thank you.

CHAIRMAN EDGAR: You're done with your cross, is that correct?

MR. SEIVER: Yes, ma'am.

CHAIRMAN EDGAR: Mr. Wright.

MR. WRIGHT: Thank you, Madam Chair. I do have limited cross-examination for Mr. Miranda relating just to his exhibits.

Yesterday afternoon a question came up about the strength of Hurricane Wilma, and I offered to -- and without FPL's objecting I have now procured copies of the National Hurricane Center's final tropical cyclone report for Hurricane Wilma that was already identified yesterday as Late-filed Exhibit Number 49, and I'm prepared to distribute those if that's convenient for you.

CHAIRMAN EDGAR: Okay. Wonderful. Thank you.

CROSS EXAMINATION

BY MR. WRIGHT:

Q Mr. Miranda, as I indicated, I have just a handful of questions regarding your exhibits, Rebuttal Exhibits MBM-4 through 6. As we discussed briefly on your direct examination yesterday, do I understand it that it's your position or testimony that these Exhibits MBM-4 through 6 comprise the description of the communities affected as required by the Commission's rules?

A We provided the detailed engineering drawings for the '07 and the outlying for the '08/'09 projects, yes.

Q And these exhibits consist of maps and electrical one line diagrams, aerial photographs showing where the hardening projects are going?

A That's correct.

Q And perhaps I did not phrase my question as clearly as I meant to, but you recall yesterday I asked you whether there was other information that comprised the company's detailed subscription of the communities affected as required by the Commission's rule?

A Yes, I remember your question.

Q And my question for you today is are these exhibits -- do you represent that these exhibits constitute that detailed description?

A Yes. It provides the detailed description of their location and the routes of those power lines.

Q Thank you. When you said you furnished or provided these, did you provide them to anybody outside the parties in this case?

A The hardening of the CIF feeders is a list that is provided by -- or we work with in conjunction with EOC personnel, they identify which circuits are what they have identified as critical infrastructure, so we're working off an agreed-upon list of what we are going to be hardening.

Q And, to the best of your knowledge, these documents were furnished to the parties in electronic format on CDs in this case, is that correct?

A That's correct, they were. CD and hard copy.

Q And that is them down there, right, about a foot tall, about 2,000 pages?

A A huge stack somewhere, yes.

MR. WRIGHT: Madam Chairman, I don't really want to go into this, but just in the interest of clarity and for the Commission's understanding, I would propose to ask Mr. Miranda just a couple of questions about wind speeds and the relationship between sustained wind speeds and gusts. I can document it from prior records, and from public records, and from prior FPL witness testimony if necessary, but I thought if I could ask two or three questions I could help you all out

with understanding what's going on here.

CHAIRMAN EDGAR: Mr. Wright, proceed, and I'm sure Mr. Butler will let us know if he has an objection.

MR. WRIGHT: I'm sure he will.

MR. BUTLER: I've got a reputation to uphold.

BY MR. WRIGHT:

Q Mr. Miranda, do you know Doctor Richard Brown?

A Yes, I do.

Q And my recollection is he was effectively the principal investigator in the KEMA study that you all did a couple of years ago?

A That's correct.

Q I aver to you, and I believe this is true from the record of one or both of your storm hardening dockets, that Doctor Brown told me, I believe under oath, that his opinion is that to relate sustained wind speeds to gusts, a factor of 25 percent above the sustained wind speed is a reasonable estimate for gusts as it relates to category strength. Is that reasonable to you?

A I think that there is some general rules or general guidelines, you know, I'm not sure what the final number is; but, yes, that's the general.

Q That's in the ballpark?

A Ballpark.

Q And, again, the data in the cyclone report are

reported in knots. Is it your understanding that one knot is equal to about 1.17 miles?

A Yes.

MR. WRIGHT: Thank you. I really just wanted to get that out for clarity, and that's all I had. Thank you.

CHAIRMAN EDGAR: No other questions on cross.

Commissioners?

Redirect.

MR. BUTLER: No redirect.

CHAIRMAN EDGAR: No redirect. Okay. Let's look at the exhibits.

MR. BUTLER: I would move the admission of Exhibits 41, 42, 43, and 54.

CHAIRMAN EDGAR: Seeing no objection, we will move 41, 42, 43, and 54 into the record for this docket.

(Exhibits 41, 42, 43, and 54 admitted.)

CHAIRMAN EDGAR: Mr. Wright.

MR. WRIGHT: Having moved yesterday, I reiterate my motion to admit Late-filed Exhibit 49, the tropical cyclone report for Hurricane Wilma.

MR. BUTLER: No objection.

CHAIRMAN EDGAR: Seeing no objection, Exhibit 49 will be entered into the record and no longer identified as late-filed.

MR. WRIGHT: Thank you.

(Exhibit 49 marked for identification and admitted into the record.)

CHAIRMAN EDGAR: The witness is excused. Thank you very much.

THE WITNESS: Thank you.

CHAIRMAN EDGAR: Okay. That is our last rebuttal witness.

Do we have any additional matters to address while we are all gathered here together? Any additional matters from staff?

MR. YOUNG: Yes, Madam Chairman. The critical dates are hearing transcripts will be available on October 18th, 2007. Briefs are due on November 2nd, 2007.

CHAIRMAN EDGAR: Any questions or comments from the parties?

Seeing none; Commissioners?

Okay. Thank you all. Once again, I know we all thank our staff for all that they do, but particularly the organizational strengths that they have shown helping us all and helping me through all of this.

And with that, we are adjourned.

MR. BUTLER: Thank you, Madam Chairman.

(The hearing concluded at 3:13 p.m.)

STATE OF FLORIDA)
: CERTIFICATE OF REPORTERS
COUNTY OF LEON)

WE, JANE FAUROT, RPR, and LINDA BOLES, RPR, CRR, Official Commission Reporters, do hereby certify that the foregoing proceeding was heard at the time and place herein stated.

IT IS FURTHER CERTIFIED that we stenographically reported the said proceedings; that the same has been transcribed under our direct supervision; and that this transcript constitutes a true transcription of our notes of said proceedings.

WE FURTHER CERTIFY that we are not a relative, employee, attorney or counsel of any of the parties, nor are we a relative or employee of any of the parties' attorneys or counsel connected with the action, nor are we financially interested in the action.

DATED THIS 18th DAY OF OCTOBER, 2007.

Linda Boles /for

JANE FAUROT, RPR
FPSC Official Commission Reporter
(850) 413-6732

Linda Boles

LINDA BOLES, RPR, CRR
FPSC Official Commission Reporter
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EXHIBITS

NUMBER:		ID.	ADMTD.
1	Comprehensive Exhibit List	28	28
2	Staff's Composite Exhibits - 2 stipulated	28	28
3	Staff's Composite Exhibits - 3 stipulated	28	28
4	Staff's Composite Exhibits - 4 stipulated	28	28
5	Staff's Composite Exhibits - 5 stipulated	28	28
6	Staff's Composite Exhibits - 6 stipulated	28	28
7	Staff's Composite Exhibits - 7 stipulated	28	28
9	JC-1T	52	52
10	JC-2T	52	52
11	JC-3T	52	52
12	MG-1T	74	74
13	MG-2T	74	74
14	MG-3T	74	74
15	MG-4T	74	74
16	MG-5T	74	74
17	MG-6T	74	74
18	EJB-1	84	
44	Slavin Depo Transcript, Pages 1-4, 61-70, Certificate of Oath, Errata Sheet	15	
45	Gulf's Responses to PCB Interrogatories Nos. 41-47	109	
46	FPL's Storm Secure Plan - January 2006	117	

EXHIBITS

NUMBER:		ID.	ADMTD.
18			151
19			165
45 through 48			152
8			262
20 through 22			223
46			224
49	(Late-filed) National Hurricane Center Tropical Cyclone Report		209
50	TECO's responses to FCTA's First Set of Interrogatories Nos. 1-30	259	262
27	KS-1, Process to Engage Third-Party Attachers	270	270
51	TECO's responses to FCTA's First Request for PODs No. 7	296	
44			305

EXHIBITS

NUMBER:		ID.	ADMTD.
34	PJR-1	455	460
35	PJR-2	455	460
36	PJR-3	455	460
37	RLW-1	474	486

EXHIBITS

NUMBER:		ID.	ADMTD.
28	MTH-1	498	498
29	MTH-2	498	498
30	MTH-3	498	498
32	MTH-5	498	498
33	MTH-6	498	498
39	EJB-2	502	539
41	MBM-4	582	624
42	MBM-5	582	624
43	MBM-6	582	624
49	National Hurricane Center Report	625	625
52	Harrelson's Errata Sheet to Testimony (070298 and 070301)	500	500
53	Proposed Revisions to FPL Witness McEvoy's Rebuttal Testimony (070301)	544	579
54	Proposed Revisions to FPL Witness Miranda's Rebuttal Testimony	580	624

Comprehensive Exhibit List for Entry into Hearing Record

Hearing I.D. #	Witness	I.D. # As Filed	Exhibit Description	Docket No.	Entered
Staff					
1		Exhibit List- 1	Comprehensive Exhibit List		
2		Staff's Composite Exhibits - 2 stipulated	1) TECO's Response to Staff's First Set of Interrogatories (Nos. 1-44) 2) TECO's Response to Staff's Second Set of Interrogatories (Nos. 45-53) 3) Deposition Transcript of Regan B. Haines (including errata sheet) 4) Late-Filed Deposition Exhibit No. 1 to the Deposition of Regan B. Haines	070297-EI – TECO	

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070297, 298, 299+ 301-EI **EXHIBIT** 1
COMPANY FL PSC Staff
WITNESS Exhibit List 1
DATE 10/2+3/07

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
3		Staff's Composite Exhibits - 3 stipulated	1) Progress' Response to Staff's First Set of Interrogatories (Nos. 1-68) 2) Progress' Response to Staff's Second Set of Interrogatories (Nos. 69-75) 3) Deposition Transcript of Jason Cutliffe (including errata sheet) 4) Late-Filed Deposition Exhibit No. 1 to the Deposition of Jason Cutliffe	070298-EI – Progress	

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
4		Staff's Composite Exhibits – 4 stipulated	1) Gulf's Response to Staff's First Set of Interrogatories (Nos. 1-47) 2) Gulf's Response to Staff's Second Set of Interrogatories (Nos. 48-53) 3) Deposition Transcript of Alan G. McDaniel (including errata sheet) 4) Deposition Transcript of Edward J. Battaglia (including errata sheet) 5) Late-Filed Deposition Exhibit No. 1 to the Deposition of Edward J. Battaglia	070299-EI – Gulf	

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
5		Staff's Composite Exhibits - 5 stipulated	1) FPL's Response to Staff's First Set of Interrogatories (Nos. 1-51) 2) FPL's Response to Staff's Second Set of Interrogatories (Nos. 52-57) 3) FPL's Response to Staff's First Request for Production of Documents (No. 1) 4) Deposition Transcript of Manuel B. Miranda (including errata sheet) 5) Late-Filed Deposition Exhibit Nos. 1, 2, 3 to the Deposition of Manuel B. Miranda 6) Deposition Transcript of John McEvoy (including errata sheet)	070301-EI – FPL	

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
6		Staff's Composite Exhibits - 6 stipulated	1) AT&T's Response to Staff's First Set of Interrogatories (Nos. 1-8) (all dockets) 2) Embarq's Response to Staff's First Set of Interrogatories (Nos. 1-8) (all dockets) 3) FCTA's Response to Staff's First Set of Interrogatories (Nos. 1-8) (all dockets) 4) Deposition Transcript of Mickey Harrelson (all dockets) (including errata sheet)	070297-EI – TECO 070298-EI – Progress 070299-EI- Gulf 070301-EI – FPL	
7		Staff's Composite Exhibits – 7 stipulated	1) Verizon's Response to Staff's First Set of Interrogatories (Nos. 1-7) 2) Deposition Transcript of Sanford Walker (including errata sheet)	070297-EI – TECO, 070298-EI – Progress, 070301-EI – FPL	

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
Testimony Exhibit List					
TECO (Direct)					
8	Regan B. Haines	RBH-1	Tampa Electric's Storm Hardening Plan Filed May 7, 2007; Cost and Benefits Matrix filed July 30, 2007; and Process to Engage Third Party Attachers	070297-EI TECO	
PEF (Direct)					
9	Jason Cutliffe	JC-1T	PEF's Storm Hardening Plan	070298-EI – PEF	
10	Jason Cutliffe	JC-2T	PEF's Plan Supplement	070298-EI – PEF	
11	Jason Cutliffe	JC-3T	Position Statements from Intervenors	070298-EI – PEF	
12	Mickey Gunter	MG-1T	Resumé	070298-EI – PEF	
13	Mickey Gunter	MG-2T	2007 NESC Rule 250C	070298-EI – PEF	
14	Mickey Gunter	MG-3T	1977 NESC Rule 250C	070298-EI – PEF	
15	Mickey Gunter	MG-4T	1987 NESC Rule 250C	070298-EI – PEF	
16	Mickey Gunter	MG-5T	2005 Comments rejecting originally approved/modified NESC change proposals 2766, 2673 and 2798 in 2003	070298-EI – PEF	

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
17	Mickey Gunter	MG-6T	Original NESC change proposals 2766, 2673 and 2798 originally approved/modified in 2003 to eliminate 60' exemption	070298-EI – PEF	
GULF (Direct)					
18	Edward J. Battaglia	EJB-1	Consisting of ten schedules showing: Map of Gulf Power's Service Area, Map of Florida Population Densities, Summary of Costs, PoleForman Analysis, Northwest Florida Hurricanes, and Extreme Wind Loading Projects	070299-EI – GULF	
19	Alan G. McDaniel	AGM-1	Consisting of one schedule: Gulf and FCTA Input Timeline	070299-EI – GULF	
FPL (Direct)					
20	Manuel B. Miranda	MBM-1	2007 Electric Infrastructure Storm Hardening Plan	070301-EI – FPL	
21	Manuel B. Miranda	MBM-2	2008-2009 CIF Projects	070301-EI – FPL	
22	Manuel B. Miranda	MBM-3	"Storm Pole Replacements" chart	070301-EI – FPL	
23	Manuel B. Miranda	MBM-4	2007 Aerial Maps & Engineering Drawings for 2007 CIF and Community Projects	070301-EI – FPL	
24	Manuel B. Miranda	MBM-5	Balance of 2007 Engineering Drawings for 2007 CIF and Community Projects	070301-EI – FPL	

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
25	Manuel B. Miranda	MBM-6	Map Drawings for 2008 and 2009 CIF Projects	070301-EI – FPL	
VERIZON (Direct)					
26	Lawrence M. Slavin	LMS-1	Slavin Experience / Industry / Activities	070301-EI	
AT&T / TCG (Direct)					
27	Kirk Smith	KS-1	Process to Engage Third-Party Attachers	070297-EI - TECO, 070298-EI - PEF, 070299-EI - GULF, 070301-EI - FPL	
FCTA (Direct)					
28	Michael T. Harrelson	MTH-1	Curriculum Vitae/List of Previously Filed Testimony	070297-EI – TECO, 070298-EI - PEF, 070299-EI – GULF 070301-EI - FPL	
29	Michael T. Harrelson	MTH-2	Affidavit of Dr. Lawrence T. Slavin	070297-EI – TECO, 070298-EI - PEF, 070299-EI – GULF 070301-EI - FPL	

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
30	Michael T. Harrelson	MTH-3	Process to Engage Third Party Attachers	070297-EI – TECO, 070298-EI - PEF, 070299-EI – GULF 070301-EI - FPL	
31	Michael T. Harrelson	MTH-4	July 24, 2007, Harrelson letter to Alan McDaniel/Pole Inspections	070299-EI - GULF	
32	Michael T. Harrelson	MTH-5	CIF projects—Lateral Line and Other Guying Effects, Lake City Veterans Administration Hospital (Columbia County)/Lee County Hospital (Fort Myers)	070301-EI - FPL	
33	Michael T. Harrelson	MTH-6	CIF projects – Large Trees by Hardened Lines, Lake City Veterans Administration Hospital (Columbia County)/Lee County Memorial Hospital (Fort Myers)	070301-EI - FPL	
PCB (Direct)					
34	Peter J. Rant, P.E.	PJR-1	Resumé of Peter J. Rant, P.E.	070299-EI - GULF	

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
35	Peter J. Rant, P.E.	PJR-2	Tropical Cyclone Report, Hurricane Dennis. Author Jack Beven, published by the National Hurricane Center, November 22, 2005	070299-EI - GULF	
36	Peter J. Rant, P.E.	PJR-3	Comparative Customer Outage Information, Panama City Beach and Pensacola, Hurricane Dennis (2005); table plus Gulf Power Company Interrogatory Responses with source data	070299-EI - GULF	
37	R.L. Willoughby	RLW-1	Resumé of R.L. Willoughby	070299-EI - GULF	
TECO (Rebuttal)					
38	Regan B. Haines	RBH-2	PoleForeman Article: Transmission & Distribution World Article: Line Loading and Clearance Calculations Improved; PoleForeman Guying Screens; Overloaded Pole Attachments; Overlashing Permits	070297-EI – TECO	

Comprehensive Exhibit List for Entry into Hearing Record					
Hearing I.D. #	**Witness**	**I.D. # As Filed**	**Exhibit Description**	**Docket No.**	**Entered**
GULF (Rebuttal)					
39	Edward J. Battaglia	EJB-2	Pictorial history of storm surge impact on underground facilities; Summary chart of utilities; National Weather Services Storm Report for Hurricane Fran, 1996; National Weather Services Storm Report for Hurricane Bertha, 1996; National Weather Services Storm Report for Hurricane Bonnie, 1998; National Weather Services Storm Report for Hurricane Dennis, 1999; North Carolina Hurricane Tracks for 1996 to 1999; Hurricane Dennis wind field data	070299-EI – GULF	
40	Alan G. McDaniel	AGM-1	Storm Hardening Plan Gulf and FCTA Input Timeline (2007)	070299-EI – GULF	
FPL (Rebuttal)					
41	Manuel B. Miranda	MBM-4	"Storm Pole Replacements" chart	070301-EI – FPL	
42	Manuel B. Miranda	MBM-5	2007 Aerial Maps & Engineering Drawings for 2007 CIF and Community Projects	070301-EI – FPL	
43	Manuel B. Miranda	MBM-6	Balance of 2007 Engineering Drawings for 2007 CIF and Community Projects	070301-EI – FPL	

HEARING EXHIBITS					
Exhibit #	**Witness**	**Counsel**	**Description**	**Docket No.**	**Moved In/Due Date of Late Filed**
44	Slavin	FCTA	Slavin Depo Transcript pgs. 1-4, 61-70, certificate of oath, errata sheet	Docket No. 070301-EI	
45	Battaglia	PCB/MUUC	Gulf's reponses to PCB Interrogatories Nos. 41-47	Docket No. 070299-EI	
46	Battaglia	PCB/MUUC	FPL's Storm Secure Plan – January 2006	Docket No. 070299-EI, 070301-EI	
47	Battaglia	PCB/MUUC	Gulf's responses to PCB Interrogatory No. 16	Docket No. 070299-EI	
48	Battaglia	PCB/MUUC	Gulf's responses to PCB Interrogatoreis Nos. 39-40	Docket No. 070299-EI	
49	Miranda	MUUC	National Hurricane Center Report	Docket No. 070301-EI	
50	Haines	FCTA	TECO's responses to FCTA's 1st Set of Interrogatories Nos. 1-30	Docket No. 070297-EI	
51	Harrelson	TECO	TECO's rsponses to FCTA's 1st Request for Production of Documents (No. 7)	Docket No. 070297-EI	
52	Harrelson	FCTA	Harrelson's Errata Sheet to Testimony	Docket No. 070298-EI, 070301-EI	
53	McEvoy	FPL	Proposed Revisions to FPL Witness McEvoy's Rebuttal Testimony	Docket No. 070301-EI	

HEARING EXHIBITS					
Exhibit #	**Witness**	**Counsel**	**Description**	**Docket No.**	**Moved In/Due Date of Late Filed**
54	Miranda	FPL	Proposed Revisions to FPL Witness Miranda's Rebuttal Testimony	Docket No. 070301-EI	
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HEARING EXHIBITS					
Exhibit #	**Witness**	**Counsel**	**Description**	**Docket No.**	**Moved In/Due Date of Late Filed**
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Exhibit #	**Witness**	**Counsel**	**Description**	**Docket No.**	**Moved In/Due Date of Late Filed**
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HEARING EXHIBITS					
Exhibit #	**Witness**	**Counsel**	**Description**	**Docket No.**	**Moved In/Due Date of Late Filed**
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HEARING EXHIBITS					
Exhibit #	**Witness**	**Counsel**	**Description**	**Docket No.**	**Moved In/Due Date of Late Filed**
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HEARING EXHIBITS					
Exhibit #	**Witness**	**Counsel**	**Description**	**Docket No.**	**Moved In/Due Date of Late Filed**
109					

EXHIBIT NO. _____

DOCKET NO: 070297-EI – TAMPA ELECTRIC COMPANY

WITNESS: VARIOUS

DESCRIPTION: STAFF'S COMPOSITE EXHIBITS - 2

DOCUMENTS:

1) TECO's Response to Staff's First Set of Interrogatories (Nos. 1-44)

2) TECO's Response to Staff's Second Set of Interrogatories (Nos. 45-53)

3) Deposition Transcript of Regan B. Haines (including errata sheet)

4) Late-Filed Deposition Exhibit No. 1 to the Deposition of Regan B. Haines

PROFFERED BY: STAFF

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070297-EI **EXHIBIT** 2
COMPANY FL. PSC Staff
WITNESS Staff's Composite Exhibits 2 Stipulated
DATE 10/02+03/07

BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company.	DOCKET NO. 070297-EI FILED: AUGUST 13, 2007

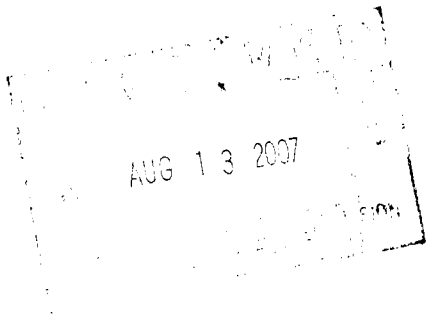
TAMPA ELECTRIC COMPANY'S

ANSWERS TO FIRST SET OF INTERROGATORIES (NOS. 1- 44)

OF

FLORIDA PUBLIC SERVICE COMMISSION STAFF

Tampa Electric files this its Answers to Interrogatories (Nos. 1 - 44) propounded and served on July 24, 2007, by the Florida Public Service Commission Staff.



TAMPA ELECTRIC COMPANY
DOCKET NO. 070297-EI
INDEX TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1-44)

Number	Witness	Subject	Bates Stamped Page
1	Haines	In its Plan, TECO asserts that its construction standards meet or exceed the National Electrical Safety Code (NESC). How does TECO verify that, at a minimum, it has complied with the 2007 NESC?	1
2	Haines	Attachment A to TECO's Plan includes copies of standards, general rules and specifications that reference the 2002 NESC. At page 6 of its Plan, TECO asserts that it relies on the 2007 NESC. Which edition of the NESC did TECO use for new construction as of February 1, 2007?	2
3	Haines	Please provide a list of each proposed change to TECO's current construction standards, policies, practices and procedures contained in its Storm Hardening Plan.	3
4	Haines	For each proposed change listed in response to Interrogatory No. 3, please state the scope of each proposed change, the estimated cost of each change, the corresponding effect of reduced storm restoration costs and outage times, and the methodology of how cost-effectiveness is determined.	4
5	Haines	What percentage of TECO's total distribution system on a mile basis is considered critical infrastructure?	8
6	Haines	What percentage of TECO's total distribution system on a plant-in-service basis is considered critical infrastructure?	9
7	Haines	What percentage of TECO's total critical infrastructure on a mile basis requires storm hardening?	10
8	Haines	What percentage of TECO's total critical infrastructure on a plant-in-service basis requires storm hardening?	11
9	Haines	What percentage of TECO's total critical infrastructure on a mile basis will be hardened for each of the years 2007 through 2009?	12
10	Haines	What percentage of TECO's total critical infrastructure on a plant-in-service basis will be hardened for each of the years 2007 through 2009?	13
11	Haines	What criteria did TECO use to determine which critical infrastructure distribution facilities should be included in its three year extreme wind pilot program referenced on page 26 and pages 37 - 40 of its Plan? Please indicate in the response which criteria TECO quantifies and which criteria are qualitative.	14
12	Haines	Please provide a list of changes to TECO's current construction standards, policies, practices and procedures contained in its Storm Hardening Plan.	15

13	Haines	For each change identified in response to Interrogatory No. 12, please state the scope of each change, the cost of each change, the corresponding effect of reducing storm restoration costs and outage times, and how cost effectiveness is determined.	16
14	Haines	During the 2004 and 2005 hurricane seasons, what percent of TECO's underground facilities located in Category 1-3 storm surge areas experienced flooding or storm surge damage?	18
15	Haines	Please provide a detailed list of the underground facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damage during the 2004 and 2005 hurricane seasons.	19
16	Haines	During the 2004 and 2005 hurricane seasons, what percent of TECO's overhead facilities located in Category 1-3 storm surge areas experienced extreme wind or wind debris damage?	20
17	Haines	Please provide a detailed list of the overhead facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damage during the 2004 and 2005 hurricane seasons.	21
18	Haines	ECO concluded that underground distribution facilities are less susceptible to storm damage than overhead distribution facilities for coastal areas of its service territory? A. If so, what is the basis for that conclusion?	22
19	Haines	Please identify all storm hardening projects located in areas TECO believes are prone to storm surge and flooding.	23
20	Haines	Please identify all critical infrastructure sites located in areas TECO believes are prone to storm surge and flooding.	24
21	Haines	Please describe the process, if any, used by TECO to mitigate flood and storm surge damage to distribution facilities when developers, communities, governmental agencies, or homeowners request distribution facilities in TECO's flood and storm surge prone areas.	25
22	Haines	Please describe TECO's current policy regarding the placement of new and replacement facilities, and identify where that policy is described in TECO's Storm Hardening Plan.	26
23	Haines	Please provide a list of changes to TECO's current construction standards, policies, practices and procedures contained in its Storm Hardening Plan.	27

24	Haines	For each change identified in response to Interrogatory No. 23, please state the scope of each change, the cost of each change, the corresponding effect of reducing storm restoration costs and outage times, and how cost effectiveness is determined.	28
25	Haines	Please provide a list of each geographic site where TECO plans to implement storm hardening activities during the years 2007 through 2009. A. For each site listed in response to Interrogatory No. 25, please state the scope of the storm hardening activity, the estimated investment costs, estimated operational expenses, estimated storm restoration costs savings, estimated reduction in storm caused outages, and the criteria TECO used to select the site for storm hardening.	29
26	Haines	Please describe the process that TECO used to determine and schedule which communities would receive electric infrastructure improvements.	30
27	Haines	e describe the process used by TECO to coordinate the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, and local communities. A. Please identify each governmental agency, company, municipality, or local community, if any, TECO coordinated with to determine the selection of critical infrastructure and major thoroughfares. B. If the response to Interrogatory No. 27(A) is "none," please provide an explanation as to why TECO has not coordinated the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, and local communities.	31
28	Haines	Please provide an analysis of TECO's estimated costs and benefits for each of its storm hardening activities for the years 2007 through 2009.	33
29	Haines	Please explain how TECO's Strom Hardening Plan facilitates the collection of operational expenses for overhead and underground distribution systems.	34
30	Haines	Please describe the process and metrics used by TECO to ensure that cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.	35

31	Haines	Please identify all specific assumptions third-party attachers should use in estimating cost impacts from TECO's Plan for each year from 2007 through 2009.	36
32	Haines	Please identify all specific assumptions third-party attachers should use in estimating benefits accruing from the implementation of TECO's Plan for each year from 2007 through 2009.	37
33	Haines	Please provide the total number of joint use poles that TECO's Plan will impact for each year from 2007 through 2009.	38
34	Haines	Please state the estimated number or percentage of joint use poles that will be impacted by TECO's Plan for each third-party attacher for each year from 2007 through 2009.	39
35	Haines	Please identify the incremental hardening costs for each year from 2007 through 2009 which will be attributable to third-party attachers.	40
36	Haines	Please identify the proportion of incremental hardening costs attributed to third-party attachers that are perceived to be PSC mandated.	41
37	Haines	For each circumstance where costs are attributed to third-party attachers, please describe the methodology that will be used by TECO to assign cost among the third-party attachers.	37
38	Haines	Please describe the process that TECO will use to notify third-party attachers of the schedule when a pole is being storm-hardened.	43
39	Haines	Please describe the process that TECO will use to determine each third-party attacher's share of the costs when a pole is being storm-hardened.	44
40	Haines	Please provide TECO's estimated reduction in storm restoration costs and customer outages for each of its storm hardening activities for each year from 2007 through 2009.	45
41	Haines	Please explain how TECO's Storm Hardening Plan facilitates the collection of operational expenses for overhead and underground distribution systems.	46
42	Haines	Please describe the process, if any, that TECO is implementing to monitor the storm hardening achieved by its Plan that would not have otherwise occurred without its Plan with respect to extreme wind loads, flood and storm surge, and location of facilities.	47
43	Haines	Please describe the process and metrics TECO uses to ensure total program cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.	48

44	Haines	Please describe the analysis TECO used to conclude that this level of activity is cost effective and achieves the goals of the Rule 25-6.0342, Florida Administrative Code.	49

Regan Haines
Director, ED Engineering
Tampa Electric Company
702 N. Franklin Street
Tampa, Florida 33602

Compliance with National Electric Safety Code

1. In its Plan, TECO asserts that its construction standards meet or exceed the National Electrical Safety Code (NESC). How does TECO verify that, at a minimum, it has complied with the 2007 NESC?

A. Tampa Electric maintains its construction standards in its General Rules and Specifications ("GRS") manuals which are reviewed and updated as needed whenever there is a change in material, work practices and procedures or NESC changes. All standards and procedures shown in the GRS manuals are based on accepted practices designed to meet, at a minimum, the requirements of the NESC and are approved by the company's Standard Practices Committee. Every five years, when the new NESC edition is published and adopted by the Commission, the company reviews and incorporates all applicable changes in its GRS manuals. The GRS manuals are published in November and provided to all personnel responsible for system engineering and design.

Tampa Electric also assures compliance with the current NESC with the use of PoleForeman pole loading analysis software. This program utilizes the current edition of the NESC along with the specified Grade of Construction to perform the pole loading analysis calculation.

2. Attachment A to TECO's Plan includes copies of standards, general rules and specifications that reference the 2002 NESC. At page 6 of its Plan, TECO asserts that it relies on the 2007 NESC. Which edition of the NESC did TECO use for new construction as of February 1, 2007?

A. Tampa Electric publishes its GRS manuals annually in November. The specified copies of standards, GRS in Attachment A, were from the current GRS publication dated November 2006. The next publication of this manual is scheduled for November 2007 and all of the attachments have been reviewed and revised if necessary to comply with the 2007 NESC. There has always been a lag between the time the Commission adopts the newest version of the NESC and the time all necessary reviews and revisions are made to the company's construction standards. This revision normally occurs in the year of the Commission adoption. In the intermediate time between the Commission adoption and the publication of Tampa Electric's GRS, the company is aware of any major significant changes and acts upon these changes immediately. The specifications in Attachment A were not affected by changes to the 2007 NESC.

Extreme Wind Loading Standards

3. Please provide a list of each proposed change to TECO's current construction standards, policies, practices and procedures contained in its Storm Hardening Plan.

A. Tampa Electric has been building to Construction Grade B and will continue to do so for all new major planned expansion, rebuild, or relocation of distribution facilities. The company believes Construction Grade B is the appropriate wind loading criteria in its service territory. This belief is based on a 150 year historical record from the National Oceanic Atmospheric Administration ("NOAA") Coastal Service Center during which the maximum sustained wind experienced was 115 miles per hour. The NESC wind maps covering Tampa Electric's territory ranges from 100 miles per hour in the eastern edge to 120 miles in the western edge. Construction Grade B has an effective wind speed of 116 miles per hour which the company believes is sufficient for its territory.

Over the next three years, Tampa Electric plans to harden to extreme wind criteria two circuits which feed some of the most critical customers on the company's system. These projects will be part of a pilot program, set up to evaluate the benefits of utilizing the NESC extreme wind loading requirements on the distribution system, and are described in more detail in the Deployment Strategy section of the plan.

In addition, the 69 kV circuit that serves the Tampa International Airport is being upgraded from wood pole construction to non-wood construction.

Concerning new overhead crossings of major thoroughfares, including interstate highways and expressways, a significant change will occur. These crossing will now be constructed underground. This also includes any reconstruction, widening or expansions of major thoroughfares.

4. For each proposed change listed in response to Interrogatory No. 3, please state the scope of each proposed change, the estimated cost of each change, the corresponding effect of reduced storm restoration costs and outage times, and the methodology of how cost-effectiveness is determined.

A. **Extreme Wind Pilot Program**

Scope

Tampa Electric's three-year strategy for piloting the extreme wind loading criteria on distribution facilities focuses on targeting two critical customers. These include a local hospital and the Port of Tampa gasoline tank storage area. The circuits feeding the hospital (1 mile) and the Port of Tampa (6 miles) will be rebuilt to meet extreme wind loading and their performance will be closely monitored during and after hurricane events and compared to the performance of other circuits in the same area built to the current standard.

Cost and Methodology

The Port of Tampa is a critical facility as it serves 10 petroleum distribution customers that deliver 40 percent of the gasoline in the state of Florida. Six miles of distribution feeder will be rebuilt to meet the extreme wind requirements as shown in Fig. 6 of the plan.

The three-year deployment strategy for this extreme wind upgrade project is as follows:

- 2007 – Rebuild a three-mile feeder to the north of the Maritime substation. This will include upgrading approximately 111 distribution poles and replacing 38 wood transmission poles with non-wood poles at an estimated cost of $760,000.

- 2008 - Rebuild the one-mile feeder to the south of the Maritime substation. This will include upgrading approximately 37 distribution poles estimated cost $120,000.

- 2009 – Rebuild a two-mile feeder from an alternative substation to pick up three miles of a previously rebuilt (from 2007 and 2008) feeder should a flooding event at the Maritime substation site occur. This will include upgrading approximately 74 distribution poles at an estimated cost of $240,000. As a side benefit, the Hillsborough County Sheriffs Operation Center will also be served from the hardened feeder.

While there are several hospitals in Tampa Electric's service territory that are considered critical customers, Saint Joseph's Hospital was chosen for this pilot program because of its Level 2 Trauma Center status, central location, high elevation and the cost effectiveness of the hardening activities. The distribution feeder serving the hospital is approximately one-mile in length and will be rebuilt to meet the extreme wind requirements. The hardening measures to be employed include replacing 37 distribution poles and with a stronger class wood poles estimated cost of $120,000 and six wood transmission poles with non-wood pole at an estimated cost of $70,000. This project is planned for 2008.

Corresponding Effect of Reduced Storm Restoration Costs and Outage Times

While in theory the newly constructed extreme wind circuits should perform better during a hurricane event, thus reducing the number of outages to customers served from those circuits, the main benefit to Tampa Electric is the ability to compare the performance of the extreme wind circuits to nearby circuits constructed to meet NESC Grade B criteria.

Methodology of Cost Effectiveness

While Tampa Electric believes NESC Grade B criteria is the appropriate construction standard to use for its service territory given historical performance, the company also believes that is prudent and cost effective to pilot the extreme wind criteria as a construction standard and to do so on two of its most critical circuits.

Tampa International Airport

Scope

Tampa International Airport is served by six distribution circuits which are all underground and emanate from one substation. Tampa Electric's plan is to upgrade a transmission segment feeding the Skyway substation to today's extreme wind construction standards. The project consists of replacing 62 existing wood transmission poles with steel or concrete poles.

Cost and Methodology

While Skyway substation has multiple transmission feeds, this project will ensure that one of them is upgraded to non-wood structures that meet today's construction standards. The project will be completed in 2009 at an estimated cost of $618,000.

Corresponding Effect of Reduced Storm Restoration Costs and Outage Times

Having newer transmission facilities engineered to today's extreme wind construction standards (use of only non-wood structures) should have an effect on reducing storm restoration costs and outage times if the company was to experience an extreme wind event.

Methodology of Cost Effectiveness

While the approximately 60 wood poles associated with this project will at some point undergo inspections to ensure that they are sound and meet all applicable loading standards, this project accelerates this and enhances the reliability of the transmission system serving Tampa International Airport, one of the most critical facilities located in Tampa Electric's service area.

Major Thoroughfare Crossings

Scope

Any new crossings of major thoroughfares, including interstate highways and expressways, are to be constructed underground. This includes any reconstruction, widening or expansions of major thoroughfares.

Cost and Methodology

The previous standard of crossing major thoroughfares was overhead with self supporting concrete poles. The new standard is to construct the crossing underground. The difference in cost is approximately $2,500 per crossing. The three year plan is to underground 12 distribution line crossings at a total estimated cost of $600,000 or four crossings per year at an annual cost of $200,000.

Corresponding Effect of Reduced Storm Restoration Costs and Outage Times

The restoration of downed overhead power lines over interstate highways can be lengthy because of heavy traffic congestion. Tampa Electric's proposed construction standard requires all distribution line interstate crossings to be underground. Therefore, the company's hardening plan calls for converting several overhead distribution line crossings on interstates I-75, I-4 and the East-West section of I-275 to underground.

Methodology of Cost Effectiveness

This activity focuses on hardening limited access highway crossings which will prevent the hindrance of first responders, emergency vehicles and others due to fallen distribution lines blocking traffic. The company believes that it is cost effective to underground these 12 existing overhead crossings given the criticality of the thoroughfares involved and the potential impact that a downed overhead crossing could cause through delaying an emergency responder as well as lengthened outage times. The estimated average cost to underground existing overhead crossings is $50,000 each. Similarly, the company believes it is cost effective to underground all future crossings over major limited access highways/interstates for the same reason. The average incremental cost is $2,500 per crossing.

5. What percentage of TECO's total distribution system on a mile basis is considered critical infrastructure?

A. Tampa Electric has identified its critical infrastructure as those circuits feeding loads which are critical to the maintenance of basic services that include: public health (water and sewage, fire, hospitals), distilled fuels (refinery, tank farm) and transport hubs (airports). These circuits have the highest restoration priority level. Examples of these types of customers in Tampa Electric's service territory include the Tampa International Airport, hospitals, Port of Tampa, County and City Emergency Operations Centers, key police and fire stations, and major water and sewage pumping facilities. The distribution circuit miles that serve these entities comprise approximately two percent of the company's distribution system.

6. What percentage of TECO's total distribution system on a plant-in-service basis is considered critical infrastructure?

A. On a plant-in-service basis, approximately two percent of Tampa Electric's total distribution system is considered critical infrastructure.

7. What percentage of TECO's total critical infrastructure on a mile basis requires storm hardening?

A. Tampa Electric has been building to NESC Construction Grade B for all critical infrastructure. The company believes Construction Grade B is the appropriate wind loading criteria in its service territory. This belief is based on a 150 year historical record from the NOAA Coastal Service Center where the maximum sustained winds experienced was 115 miles per hour. The NESC wind maps covering the company's service area ranges from 100 miles per hour along the eastern edge to 120 miles per hour along the western edge. Construction Grade B has an effective wind speed of 116 miles per hour which has proven to be sufficient for the company's service area based on storm experiences. Therefore, considering these experiences and all information available at this time, the company does not believe that its critical infrastructure requires storm hardening in excess of its standard construction practices.

8. What percentage of TECO's total critical infrastructure on a plant-in-service basis requires storm hardening?

A. Please see response to Interrogatory No. 7.

Hearing Exhibit - 000017

9. What percentage of TECO's total critical infrastructure on a mile basis will be hardened for each of the years 2007 through 2009?

A. Tampa Electric's three-year strategy for piloting the extreme wind loading criteria on distribution facilities focuses on targeting two critical customers. These include a local hospital and the Port of Tampa gasoline tank storage area. The circuits feeding the hospital (1 mile) and the Port of Tampa (6 miles) will be rebuilt to meet extreme wind loading and their performance will be closely monitored during and after hurricane events and compared to the performance of other circuits in the same area built to the current standard.

Since the early 1970s, Tampa Electric has built its distribution system to Construction Grade B having an effective wind speed of 116 mph. Given the strength and past performance of Construction Grade B on its system, the company believes it is necessary to evaluate the performance of these pilot project hardened circuits before a cost effective decision can be rendered for additional extreme wind construction to occur.

10. What percentage of TECO's total critical infrastructure on a plant-in-service basis will be hardened for each of the years 2007 through 2009?

A. Please see response to Interrogatory No. 9.

11. What criteria did TECO use to determine which critical infrastructure distribution facilities should be included in its three year extreme wind pilot program referenced on page 26 and pages 37 - 40 of its Plan? Please indicate in the response which criteria TECO quantifies and which criteria are qualitative.

A. Tampa Electric considered the following criteria to determine the critical infrastructure distribution facilities included in its three year extreme wind pilot program: importance to the state, importance to local community and the cost effectiveness of the hardening project. These are more fully described below.

Port of Tampa Pilot Project

Florida imports all of its refined products. The Port of Tampa is a critical facility as it serves 10 petroleum distribution customers that deliver 40 percent of the gasoline in the state of Florida. Severe power outages could cause fuel shortages across the region and hamper rescue, recovery and restoration activities.

Saint Joseph's Hospital Pilot Project

While there are several hospitals in Tampa Electric's service territory that are considered critical customers, Saint Joseph's Hospital was chosen for this pilot program because of its Level 2 Trauma Center status, central location, high elevation and the cost effectiveness of the hardening activities.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities

Subject matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

12. Please provide a list of changes to TECO's current construction standards, policies, practices and procedures contained in its Storm Hardening Plan.

A. Tampa Electric's changes to current construction standards contained in its Storm Hardening Plan are listed below.

Underground Facilities in Flood Zone 1 Designated Areas

All new underground construction in Flood Zone 1 designated areas shall include the following: all single phase stainless steel transformers, moisture block cables, submersible secondary connectors, stainless steel switchgear and all padmounted equipment shall be fastened to concrete pad with stainless steel bolts.

All maintenance replacements within Flood Zone 1 designated areas due to failure or upgrade will be replaced with the same material used for new construction. Mild steel material should not be installed unless there is no substitute or it is currently the only type available.

13. For each change identified in response to Interrogatory No. 12, please state the scope of each change, the cost of each change, the corresponding effect of reducing storm restoration costs and outage times, and how cost effectiveness is determined.

A. **Underground Construction in Flood Zone 1**

Scope

The company's proposed standard is that all new underground distribution facilities (padmounted transformer, switchgear, load break cabinets and padmounted capacitors) located in the Flood Zone 1 designated area shall be of stainless steel or aluminum construction and bolted to the concrete pad. Upgrading the material from mild steel to stainless steel or aluminum is more durable and typically extends equipment life after saltwater contamination; however, the equipment will require cleaning following a flooding event prior to re-energizing. Any maintenance replacements in this designated area shall also be replaced with a stainless steel or aluminum equivalent.

Cost

Equipment Type	Incremental Cost
Transformer Stainless Steel e.g., 75 kVA transformer incremental	90% adder $2,000/Transformer increase
Submersible Secondary Connector	$300/Transformer
All Stainless Steel Switchgear e.g., S&C PMH-9	25% adder $2,500/Switchgear increase

Corresponding Effect of Reduced Storm Restoration Costs and Outage Times

The coastal area of Tampa Electric's service area is unique in that it is not similar to barrier island coastal area that can be severely impacted by hurricanes and result in the reshaping of the coast line and destruction of facilities. The company's coastline has the potential of high water intrusion that will retreat once the storm passes.

Restoration of flooded areas will depend on the height of the water. No restoration can take place until the water recedes. Once the water recedes and roads are drivable, all transformers and switchgears will be opened, inspected and washed down with fresh water. This will in itself preserve the life and reliability of the equipment and thereby reduce long term restoration cost. However, the short term restoration cost and outage time will be in the cost of washing the equipment. Also, if high water occurs, homeowners will also be impacted with water intrusion into their dwellings thus rendering them uninhabitable.

Cost Effectiveness Determination

Quantifying cost effectiveness is difficult without storm damage experience. It can be assumed that exposure of mild steel equipment to salt water contamination will significantly shorten the expected life of the equipment from the typical 30 years. If a saltwater flooding event occurs, significant loss of life could result on the padmounted transformer and switchgear fleet. The company anticipates that changing its construction standards to use a corrosive resistance metal such as stainless steel or aluminum in its pad mounted equipment will greatly extend the life. Some loss of life can be expected due to the cleaning process and the inability to remove 100% of the salt residue. The use of submersible secondary connectors will have an immediate benefit in reducing the number of failures and improving restoration times following a surge event, as well as a long term benefit in extending the life of the equipment.

Subject matter: Areas prone to flooding and storm surge

14. During the 2004 and 2005 hurricane seasons, what percent of TECO's underground facilities located in Category 1-3 storm surge areas experienced flooding or storm surge damage?

A. During the 2004 and 2005 hurricane seasons, Tampa Electric did not experience damage to underground facilities in Category 1-3 storm surge areas.

15. Please provide a detailed list of the underground facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damage during the 2004 and 2005 hurricane seasons.

A. Please see response to Interrogatory No. 14.

16. During the 2004 and 2005 hurricane seasons, what percent of TECO's overhead facilities located in Category 1-3 storm surge areas experienced extreme wind or wind debris damage?

A. During the 2004 and 2005 hurricane seasons, Tampa Electric did not experience any extreme wind or wind debris damage to its overhead facilities in Category 1-3 storm surge areas.

17. Please provide a detailed list of the overhead facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damage during the 2004 and 2005 hurricane seasons.

A. Please see response to Interrogatory No. 16.

18. Has TECO concluded that underground distribution facilities are less susceptible to storm damage than overhead distribution facilities for coastal areas of its service territory?

A. If so, what is the basis for that conclusion?

A. Storm damage can be categorized as: 1) wind only damage; 2) wind borne debris damage; and 3) flood and surge damage. The placement of underground distribution facilities along the coast is not risk free. If the storm is a wind event only, underground facilities should be very effective. However, if the storm is also a flood or storm surge event, the high water will cause damage to underground systems that cannot sustain operations as well as an overhead system. After a flooding event, all the underground equipment must be washed and inspected before energizing, thus causing some delays in restoration. However, the restoration of an overhead system after a flooding event is much faster relative to the underground system.

19. Please identify all storm hardening projects located in areas TECO believes are prone to storm surge and flooding.

A. Tampa Electric has one storm hardening project located in an area where the company believes storm surge and flooding could occur. This project is the testing and repair of 18 network protectors in low lying areas in downtown Tampa.

20. Please identify all critical infrastructure sites located in areas TECO believes are prone to storm surge and flooding.

A. Tampa Electric has identified the Tampa downtown network as a critical infrastructure site located in a potential flood and storm surge area.

21. Please describe the process, if any, used by TECO to mitigate flood and storm surge damage to distribution facilities when developers, communities, governmental agencies, or homeowners request distribution facilities in TECO's flood and storm surge prone areas.

A. Currently any developers, communities, governmental agencies, or homeowners requesting underground distribution facilities in flood and storm surge areas are granted their request with the appropriate CIAC. In addition, all new underground construction in Flood Zone 1 designated areas shall include the following: all single phase stainless steel transformers, moisture block cables, submersible secondary connectors, stainless steel switchgear, and all padmounted equipment shall be fastened to concrete pad with stainless steel bolts.

Placement of New and Replacement Distribution Facilities to Facilitate Safe and Efficient Access

Subject matter: Incremental Changes to Standards for Placement of New and Replacement Distribution Facilities.

22. Please describe TECO's current policy regarding the placement of new and replacement facilities, and identify where that policy is described in TECO's Storm Hardening Plan.

A. Tampa Electric's policy is to place all new distribution facilities in public right-of-way ("ROW"), which is typically in the front of the customer premises. The company clearly recognizes that limited access to facilities located behind the customer's premises significantly increases restoration time. This frontal approach facilitates efficient access during installation and maintenance of the facilities. Prior to 1970 and this policy, distribution facilities were constructed in rear lot easements. From time to time, communities or homeowner associations make inquiries regarding the relocation of overhead facilities from rear lot locations to the front of customers' properties. Tampa Electric evaluates each inquiry on a case-by-case basis for feasibility, practicality and cost effectiveness. Consideration is given to the impact of any tree trimming required along the front of the property (aesthetics), conversion costs, joint attacher cost impacts and scheduling, ROW availability, customer's service main locations and the availability of front access to the dwelling or building. This policy is stated in Section 6.1.2.3 "Location of Facilities" of Tampa Electric's Storm Hardening Plan filed May 7, 2007.

23. Please provide a list of changes to TECO's current construction standards, policies, practices and procedures contained in its Storm Hardening Plan.

A. There are no changes to Tampa Electric's construction standards related to the placement of new and replacement distribution facilities.

Hearing Exhibit - 000033

24. For each change identified in response to Interrogatory No. 23, please state the scope of each change, the cost of each change, the corresponding effect of reducing storm restoration costs and outage times, and how cost effectiveness is determined.

A. Please see response to Interrogatory No. 23.

Description of Facilities Affected

25. Please provide a list of each geographic site where TECO plans to implement storm hardening activities during the years 2007 through 2009.

A. For each site listed in response to Interrogatory No. 25, please state the scope of the storm hardening activity, the estimated investment costs, estimated operational expenses, estimated storm restoration costs savings, estimated reduction in storm caused outages, and the criteria TECO used to select the site for storm hardening.

A. Please see response to Interrogatory No. 23. Tampa Electric's current 2007–2009 Storm Hardening Plan does not contemplate any changes to the company's standards for placement of new and replacement distribution facilities.

Communities and Areas Where Electric Infrastructure Improvements are to be Made

26. Please describe the process that TECO used to determine and schedule which communities would receive electric infrastructure improvements.

A. In determining and scheduling proposed hardening projects, Tampa Electric focused on the most critical areas of need as well as those areas that would have delayed restoration without storm hardening following an extreme weather event. The areas were healthcare, transportation, fuel and evacuation routes. Several extreme wind standard pilot projects have been proposed that will allow the company to monitor and analyze the performance after an extreme wind storm event in order to determine if the higher standard should be justified for critical infrastructure. However, since Tampa Electric's standard of Construction Grade B is higher than the minimum required by the NESC and has proven to be appropriate for the expected winds for its service territory, the company believes that all customers are served by adequate infrastructure.

Utility's Definition of Critical Infrastructure and Major Thoroughfares

27. Please describe the process used by TECO to coordinate the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, and local communities.

    A. Please identify each governmental agency, company, municipality, or local community, if any, TECO coordinated with to determine the selection of critical infrastructure and major thoroughfares.

    B. If the response to Interrogatory No. 27(A) is "none," please provide an explanation as to why TECO has not coordinated the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, and local communities.

A. Tampa Electric relied upon its relationships and past experiences with Emergency Operations Centers ("EOC") throughout its service area in determining critical infrastructure. This EOC experience allowed the company to determine the importance of an accessible interstate system and therefore the need for undergrounding the distribution lines over those major thoroughfares. Additionally, the company initially identified the Port of Tampa as a potential critical infrastructure and subsequent meetings with the management of the Port confirmed that decision. Thus, the pilot project to harden the Port's circuit to extreme wind was made.

Since the early 1970s, Tampa Electric has been building its distribution system across the entire service area to NESC Construction Grade B. Since that time, all critical infrastructure has been built and maintained to that standard. The company believes Construction Grade B is the appropriate wind loading criteria in its service territory. This belief is based on a 150 year historical record from the NOAA Coastal Service Center where the maximum sustained winds experienced was 115 miles per hour. The NESC wind maps covering the company's service area ranges from 100 miles per hour along the eastern edge to 120 miles per hour along the western edge. Construction Grade B has an effective wind speed of 116 miles per hour which has proven to be sufficient for the service area based on storm experiences. Therefore, considering these

experiences and all information available at this time, the company does not believe that its critical infrastructure requires storm hardening in excess of its standard construction practices.

Estimate of Costs and Benefits to TECO

28. Please provide an analysis of TECO's estimated costs and benefits for each of its storm hardening activities for the years 2007 through 2009.

A. Please refer to Tampa Electric's cost benefit matrix of its storm hardening initiatives provided to the Commission Staff on July 30, 2007.

29. Please explain how TECO's Strom Hardening Plan facilitates the collection of operational expenses for overhead and underground distribution systems.

A. Tampa Electric's accounting system allows the separation and collection of regular day to day overhead versus underground operational expenses. This was implemented several years ago. As a result of recent CIAC rule changes, Tampa Electric's accounting procedures for tracking storm restoration costs have been revised to better capture overhead versus underground costs separately. These initiatives were implemented separately from the company's Storm Hardening Plan. Additionally, through Tampa Electric's initiatives that address Item 6 (Post Storm Data Collection and Forensic Analysis) and Item 7 (Collection of Detailed Outage Data, OH vs UG) in its Ten Point Storm implementation Plan, the company will be able to analyze in more detail the storm restoration cost difference between overhead and underground systems.

30. Please describe the process and metrics used by TECO to ensure that cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.

A. Tampa Electric has data from the 2004 and 2005 storm seasons that provide actual costs incurred for system restoration, the number of customer outages that occurred and the duration of those outages. Experience from these storm restoration activities has greatly contributed to the many components of the company's overall initiatives in its storm hardening plans. Utilizing this experience and actual data and applying empirical knowledge has indicated a preliminary cost effectiveness of Tampa Electric's approach; however, the true measure of effectiveness will not be known until the company experiences another storm. At that time, the post-storm data collection and detailed forensic analysis should lend the necessary information to ultimately determine the cost effectiveness of the company's plan.

Estimate of Costs and Benefits to Third-Party Attachers

31. Please identify all specific assumptions third-party attachers should use in estimating cost impacts from TECO's Plan for each year from 2007 through 2009.

A. Tampa Electric has provided its proposed hardening projects to all affected third-party attachers. These projects are in the preliminary stages of planning and have not been fully engineered. The company has offered to ride the actual circuit routes of the hardening projects with field personnel from the affected third-party attachers. This would allow pole counts and hardware needs to be identified. To date, two attachers have availed themselves of the opportunity. Finally, the company has offered to conduct follow-up discussions and meetings with the attachers and these are underway.

32. Please identify all specific assumptions third-party attachers should use in estimating benefits accruing from the implementation of TECO's Plan for each year from 2007 through 2009.

A. Please see response to Interrogatory No. 31.

33. Please provide the total number of joint use poles that TECO's Plan will impact for each year from 2007 through 2009.

A. See table below.

Joint Use Poles Impacted by Storm Hardening Projects

Project	Tangent	# of Joint Use Poles Dead-ends/Corners	Underground Take-Offs	Total
Port of Tampa				
Bright House	60	16	5	81
Verizon	99	40	18	157
Traffic Control	3			3
4 kV Conversion				
Bright House	225	88	10	323
Verizon	103	29	15	147
Tampa International Airport				
Bright House	16	0	2	18
Verizon	26	5	0	31
Traffic Control	33	2		35
St. Joseph's Hospital				
Bright House	20	7	1	28
Verizon	10	1	1	12
Total	**595**	**188**	**52**	**835**

34. Please state the estimated number or percentage of joint use poles that will be impacted by TECO's Plan for each third-party attacher for each year from 2007 through 2009.

A. The total number of joint use poles that may be affected is 835. This represents 0.37 percent of the total joint use poles in Tampa Electric's system.

35. Please identify the incremental hardening costs for each year from 2007 through 2009 which will be attributable to third-party attachers.

A. Tampa Electric has not received the third-party attacher costs associated with its 2007–2009 planned hardening projects. However, the company assumes that third-party attachers will incur any transfer costs required for pole attachments. In some cases, where Tampa Electric crews can transfer certain tangent Verizon attachments, there will be no incremental cost to Verizon for those transfers. If the existing poles are found to be overloaded and third-party attachments were not permitted, Tampa Electric will enter into a cost sharing arrangement with the third-party attacher having been found to overload those poles.

36. Please identify the proportion of incremental hardening costs attributed to third-party attachers that are perceived to be PSC mandated.

A. The only incremental costs attributable to third-party attachers that are associated with Tampa Electric's Storm Hardening Plan and Rule 25-6.0342 will be any transfer costs required for existing attachments to be relocated to the new poles, assuming all attachments have been permitted by the third-party attachers and that all existing poles meet loading requirements. In some cases, where Tampa Electric crews can transfer certain tangent Verizon attachments and there will be no incremental cost to Verizon for those transfers. If the existing poles are found to be overloaded and third-party attachments were not permitted, Tampa Electric will enter into a cost sharing arrangement with the third-party attacher having been found to overload those poles. While the new Rule 25-6.0342 is Commission mandated, a contractual requirement exists today which requires third-party attachers to transfer existing attachments from old poles to any newly installed Tampa Electric poles.

37. For each circumstance where costs are attributed to third-party attachers, please describe the methodology that will be used by TECO to assign cost among the third-party attachers.

A. Please see response to Interrogatory No. 36.

38. Please describe the process that TECO will use to notify third-party attachers of the schedule when a pole is being storm-hardened.

A. Tampa Electric will first notice the third-party attachers as part of the annual "process within a process" where proposed projects for the following year will be communicated to all interested third-party attachers several times during the prior year. After internal finalization of the next year's planned activity, Tampa Electric will notify all affected attachers through the National Joint Utility Notification System process. This system is a web-based notification that allows utilities to send specific information to member third-party attachers regarding new construction activities that may affect their existing attachments or future attachments. Third-party attachers respond to these notifications through this system indicating the impact to their attachments, and to notify utilities of completed work that was requested such as transfers to new poles.

39. Please describe the process that TECO will use to determine each third-party attacher's share of the costs when a pole is being storm-hardened.

A. Please see response to Interrogatory No. 35.

Estimate of the Effect of Reducing Storm Restoration Costs and Customer Outages

40. Please provide TECO's estimated reduction in storm restoration costs and customer outages for each of its storm hardening activities for each year from 2007 through 2009.

A. Please refer to Tampa Electric's cost benefit matrix of its storm hardening initiatives provided to the Commission Staff on July 30, 2007

41. Please explain how TECO's Storm Hardening Plan facilitates the collection of operational expenses for overhead and underground distribution systems.

A. Please see response to Interrogatory No. 29.

42. Please describe the process, if any, that TECO is implementing to monitor the storm hardening achieved by its Plan that would not have otherwise occurred without its Plan with respect to extreme wind loads, flood and storm surge, and location of facilities.

A. Tampa Electric will conduct annual audits to verify compliance with all hardening construction standards. Additionally, should a storm event occur, Tampa Electric will deploy a thorough forensic data collection and analysis team in accordance with the company's Ten Point Storm Implementation Plan. This effort will include all hardening projects and activities.

43. Please describe the process and metrics TECO uses to ensure total program cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.

A. Please see response to Interrogatory No. 30.

44. Please describe the analysis TECO used to conclude that this level of activity is cost effective and achieves the goals of the Rule 25-6.0342, Florida Administrative Code.

A. To the extent possible, Tampa Electric quantified the cost effectiveness of its activities associated with Rule 25-6.0432 in the matrix of costs and benefits provided to the Commission Staff on July 30, 2007. To further clarify, the company attached to the matrix its assumptions and notes specific to the methodology used.

Tampa Electric has been building to NESC Construction Grade B and will continue to do so for all critical infrastructure, major thoroughfares, new construction, expansions, rebuild and relocations. The company believes Construction Grade B is the appropriate wind loading criteria for its service territory. This belief is based on a 150 year historical record from the NOAA Coastal Service Center where the maximum sustained winds experienced was 115 miles per hour. The NESC wind maps covering Tampa Electric's territory ranges from 100 miles per hour in the eastern edge to 120 miles per hour in the western edge. Construction Grade B has an effective wind speed of 116 miles per hour which the company believes is sufficient for its territory. Building to this standard has yielded the lowest restoration cost per customer in the state.

Tampa Electric's proposed extreme wind pilot projects are a logical and reasonable approach to obtain the data on system performance following an extreme wind storm. This data will be analyzed and used to validate if building to a higher extreme wind construction grade standard will result in shorter restoration times and reduced outages.

AFFIDAVIT

STATE OF FLORIDA)
)
COUNTY OF HILLSBOROUGH)

Before me the undersigned authority personally appeared Brenda Irizarry who deposed and said that she is Coordinator Regulatory Affairs, Tampa Electric Company, and that the individuals listed in Tampa Electric Company's response to Staff's First Set of Interrogatories, (Nos. 1-44) prepared or assisted with the responses to these interrogatories to the best of her information and belief.

Dated at Tampa, Florida this 10th day of August, 2007.

Brenda Irizarry

Sworn to and subscribed before me this 10th day of August, 2007.

Vicki L Maddox

Notary Public: Vicki L. Maddox

VICKI L. MADDOX
MY COMMISSION # DD 555408
EXPIRES: September 19, 2010
Bonded Thru Notary Public Underwriters

My Commission expires _____

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C. submitted by Tampa Electric Company.	)))))	DOCKET NO. 070297-EI FILED: August 13, 2007

TAMPA ELECTRIC COMPANY'S NOTICE OF SERVICE OF ANSWERS TO FIRST SET OF INTERROGATORIES (NOS. 1-44) OF THE FLORIDA PUBLIC SERVICE COMMISSION STAFF

Tampa Electric Company has this date furnished by hand delivery to Ms. Lorena A. Holley, Senior Attorney, Office of General Counsel, Florida Public Service Commission, 2540 Shumard Oak Blvd., Tallahassee, FL 32399-0850, its Answers to Staff's First Set of Interrogatories (Nos. 1-44), propounded and served by U. S. Mail on July 24, 2007.

DATED this 13th day of August 2007.

Respectfully submitted,

LEE L. WILLIS
JAMES D. BEASLEY
Ausley & McMullen
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ATTORNEYS FOR TAMPA ELECTRIC COMPANY

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing Notice of Service to Staff's First Set of Interrogatories (Nos. 1-44), filed on behalf of Tampa Electric Company, has been furnished by U. S. Mail or hand delivery (*) on this 13th day of August 2007 to the following:

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Hearing Exhibit - 000058

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c/o The Florida Legislature
111 West Madison Street, Room 812
Tallahassee, FL 32399-1400

ATTORNEY

Hearing Exhibit - 000059

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BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company.	DOCKET NO. 070297-EI FILED: SEPTEMBER 25, 2007

TAMPA ELECTRIC COMPANY'S

ANSWERS TO SECOND SET OF INTERROGATORIES (NOS. 45-53)

OF

FLORIDA PUBLIC SERVICE COMMISSION STAFF

Tampa Electric files this its Answers to Interrogatories (Nos. 45 - 53) propounded and served on September 5, 2007, by the Florida Public Service Commission Staff.

TAMPA ELECTRIC COMPANY
DOCKET NO. 070297-EI
INDEX TO STAFF'S SECOND SET OF INTERROGATORIES (NOS. 45-53)

Number	Witness	Subject	Bates Stamped Page
45	Haines	What is TECO's annual revenue requirements for the Company's Storm Hardening Plan from 2004 through 2009.	1
46	Haines	What is TECO's current incremental cost for upgrading a grade C pole to grade B pole for 2007?	2
47	Haines	Is TECO currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?	3
48	Haines	If your response to Staff Interrogatory No. 47 is yes, please give examples of the level of information TECO exchanges using NJUNS.	4
49	Haines	If your response to Staff Interrogatory No. 47 is no, is TECO planning on using NJUNS in the future for notifying parties of utility construction activities?	5
50	Haines	If your response to Staff Interrogatory No. 49 is yes, please describe how, when and with whom will TECO use NJUNS to exchange information regarding construction activities.	6
51	Haines	Please refer to Tampa Electric's response to Staff's First Set of Interrogatories, Interrogatory No. 35. What is the estimated hardening costs TECO plans to incur for each year 2007 through 2009, that TECO will be seeking to recover from third party attachers. Please respond separately for each affected attacher.	7
52	Haines	Please refer to Tampa Electric's response to Staff's First Set of Interrogatories, Interrogatory No. 36. What percentage of the estimated hardening costs TECO plans to incur for each year 2007 through 2009 that TECO will be seeking to recover from third party attachers. Please respond separately for each affected attacher.	8

53	Haines	Please refer to Tampa Electric's response to Staff's First Set of Interrogatories, Interrogatory No. 39. Please describe the process or methodology the company will use to determine each third-party attacher's share of the estimated hardening costs incurred by TECO for each year 2007 through 2009, for poles that are being storm hardened.	9

Regan Haines
Director, ED Engineering
Tampa Electric Company
702 N. Franklin Street
Tampa, Florida 33602

45. What is TECO's annual revenue requirements for the Company's Storm Hardening Plan from 2004 through 2009 for each of the following sub-components:

a. Wooden Pole Inspections
b. Ten Storm Hardening Initiatives
c. Compliance NESC Extreme Wind Loading Standards
d. Mitigating flood and storm surge damage to underground and supporting overhead facilities
e. Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance
f. Other Distribution Hardening Activities

A. Please see table below.

Items c, d and f have been combined. The principle component of these costs is the company's pilot extreme wind projects occurring over the next three years; however, other activities include undergrounding interstate crossings, upgrading the underground hardware in Flood Zone 1, converting the remaining 4kV circuits to 13KV and the testing and repair of the Tampa downtown network.

For item e, new facilities will continue to be placed in right-of-ways such that safe and efficient access can be achieved. However, Tampa Electric does not have any planned activities associated with the replacement of distribution facilities from rear lot to front lot.

Tampa Electric's Storm Hardening Plan
Annual Revenue Requirements (in millions)
2004 - 2009

	2004	2005	2006	2007	2008	2009
Wooden Pole Inspections	$0.8	$1.2	$2.3	$5.3	$8.1	$10.9
Ten Storm Hardening Initiatives	5.2	6.0	10.4	12.1	16.5	19.5
Items c, d and f	0.0	0.0	0.0	0.1	0.4	0.7
Total	$6.0	$7.2	$12.7	$17.5	$25.0	$31.1

46. What is TECO's current incremental cost for upgrading a grade C pole to grade B pole for 2007?

a. What is TECO's current incremental cost for upgrading a grade B pole to a grade A pole for 2007?

A. Based on a one mile model the average incremental cost to upgrade a Grade C pole to Grade B for 2007 is $154 per pole.

(a) Base on this same model the average incremental cost to upgrade a Grade B pole to Extreme Wind Grade B within the 120 mph wind zone for 2007 is $157.

47. Is TECO currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?

A. Yes. Tampa Electric currently sends notifications regarding major planned capital projects, future pole replacements or relocations, and notices for transfers to third parties.

48. If your response to Staff Interrogatory No. 47 is yes, please give examples of the level of information TECO exchanges using NJUNS.

A. Tampa Electric sends the following information and detail to third party attachers through NJUNS:

1. Major planned capital projects: description of the project, location of project, contact person name and telephone number, estimated start date of the project, and electronic drawings if available, otherwise drawings will be delivered to the third parties.
2. Future pole replacements or relocations: description of construction, location of construction by pole number, contact person name and telephone number, estimated start date, electronic drawing.
3. Transfer notice: description of transfer, location of transfer by pole number, order of third party transfer (this instruction indicates which third party must transfer first, second, etc.) contact person name and telephone number, estimated start date, electronic drawing.
4. Code violations or make-ready: description of code violation or make-ready construction, location of code violation or make-ready construction by pole number, contact person name and telephone number, required completion date, electronic drawing if available or necessary.

49. If your response to Staff Interrogatory No. 47 is no, is TECO planning on using NJUNS in the future for notifying parties of utility construction activities?

A. See response to Interrogatory No. 47.

50. If your response to Staff Interrogatory No. 49 is yes, please describe how, when and with whom will TECO use NJUNS to exchange information regarding construction activities.

A. Tampa Electric uses NJUNS as detailed in responses to Interrogatory Nos. 47 and 48.

51. Please refer to Tampa Electric's response to Staff's First Set of Interrogatories, Interrogatory No. 35. What is the estimated hardening costs TECO plans to incur for each year 2007 through 2009, that TECO will be seeking to recover from third party attachers. Please respond separately for each affected attacher.

A. Tampa Electric will not seek direct recovery of any costs incurred associated with the storm hardening projects listed in its 2007-2009 Storm Hardening Plan. However, if an unauthorized attacher is determined to be the cause of an identified overloaded pole, that attacher will have some cost responsibility. The number of these cases cannot be predicted; therefore, Tampa Electric has not estimated these costs but does not expect them to be significant. In addition, the pole attachment rates the company charges cable operators and telecommunication carriers will increase approximately $.06 per attachment per year for every one million dollars Tampa Electric invests to storm harden its overhead system. Tampa Electric is seeking approval to invest over $3 million incrementally through 2009 to facilitate funding its extreme wind pilot projects, rebuilding the transmission circuit feeding Tampa International Airport, converting the remaining 4kV circuits to 13kV, and hardening critical overhead 13kV interstate crossings. Bright House Networks is by far the largest cable television attacher in the company's service territory with approximately 165,000 attachments. Based on these estimates, Tampa Electric will recover an additional $10,000 per year in rental rates from Bight House Networks. The next largest cable television operator in the company's system is Adelphia Communications with approximately 6,000 attachments which will equate to an additional $360 per year in rental rates. Verizon pole attachment rental rates are fixed per the current contract and will not change until a new rate and contract are negotiated.

52. Please refer to Tampa Electric's response to Staff's First Set of Interrogatories, Interrogatory No. 36. What percentage of the estimated hardening costs TECO plans to incur for each year 2007 through 2009 that TECO will be seeking to recover from third party attachers. Please respond separately for each affected attacher.

A. Tampa Electric has estimated $1 million per year of incremental investment for the projects identified in its 2007-2009 Storm Hardening Plan. The estimated $10,000 of additional annual rental revenue that will be received from Bright House Networks equates to 1.0 percent of these total hardening costs. The estimated $360 of additional annual rental revenue that will be received from Adelphia Communications equates to 0.04 percent of these total hardening costs.

53. Please refer to Tampa Electric's response to Staff's First Set of Interrogatories, Interrogatory No. 39. Please describe the process or methodology the company will use to determine each third-party attacher's share of the estimated hardening costs incurred by TECO for each year 2007 through 2009, for poles that are being storm hardened.

A. There are multiple situations that need to be addressed when discussing third-party attacher cost responsibility relative to Tampa Electric's 2007-2009 Storm Hardening Plan. First, any increased rental rates for pole attachments will be allocated through the cable television and telecommunication carrier attachment rates established by the Federal Communications Commission's attachment rate formula. Second, as previously discussed in Tampa Electric's response to Staff's First Set of Interrogatories, No. 35, all third party attachers will be required to transfer on to the new storm hardened facilities. In some cases, where Tampa Electric crews can transfer certain tangent Verizon attachments, there will be no incremental cost to Verizon for those transfers. Finally, during pole inspections, when an inspected pole is overloaded, the pole loading analysis provides the percent utilization of each attaching party. If all attaching parties are permitted to be on the pole, Tampa Electric will assume all cost responsibility for bringing the pole into compliance. However, if there are unauthorized attachments on the pole, the company will work with all of the attaching entities to develop a fair cost sharing arrangement. In doing this, it is always assumed that the company was the first attacher. If it is determined that the company's attachments overloaded the pole, the company will take complete responsibility. If the company's attachments did not overload the pole, then the next likely attacher is evaluated. If that attacher overloaded the pole, the attacher is assessed with the cost for correcting the overload. If that attacher did not cause the overload, then the next likely attacher is evaluated and so on and so forth. Where there is a dispute, the company and the third party attachers attempt to prove when their respective attachments were made to the overloaded pole. Ultimately, if an approved application for attachment cannot be found by either party, it is assumed the attaching party assessed with the overload did not have an authorized attachment. In this case, that party is responsible to pay for the make-ready that will bring the pole back into compliance, or in the alternative, remove its attachments and thus bring the pole back into compliance.

A F F I D A V I T

STATE OF FLORIDA)
)
COUNTY OF HILLSBOROUGH)

Before me the undersigned authority personally appeared Howard Bryant who deposed and said that he is Manager Rates, Tampa Electric Company, and that the individuals listed in Tampa Electric Company's response to Staff's Second Set of Interrogatories, (Nos. 45-53) prepared or assisted with the responses to these interrogatories to the best of his information and belief.

Dated at Tampa, Florida this 24th day of September, 2007.

Howard T. Bryant

Sworn to and subscribed before me this 24th day of September, 2007.

Brenda Irizarry

Notary Public State of Florida
Brenda Lee Irizarry
My Commission DD551587
Expires 07/29/2010

My Commission expires _____

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C. submitted by Tampa Electric Company.	)))))	DOCKET NO. 070297-EI FILED: September 25, 2007

TAMPA ELECTRIC COMPANY'S NOTICE OF SERVICE OF ANSWERS TO SECOND SET OF INTERROGATORIES (NOS. 45-53) OF THE FLORIDA PUBLIC SERVICE COMMISSION STAFF

Tampa Electric Company has this date furnished by hand delivery to Ms. Katherine Fleming and Mr. Keino Young, Senior Attorneys, Office of General Counsel, Florida Public Service Commission, 2540 Shumard Oak Blvd., Tallahassee, FL 32399-0850, its Answers to Staff's Second Set of Interrogatories (Nos. 45-53), propounded and served by U. S. Mail on September 5, 2007.

DATED this 25th day of September 2007.

Respectfully submitted,

LEE L. WILLIS
JAMES D. BEASLEY
Ausley & McMullen
Post Office Box 391
Tallahassee, Florida 32302
(850) 224-9115

ATTORNEYS FOR TAMPA ELECTRIC COMPANY

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing Notice of Service to Staff's Second Set of Interrogatories (Nos. 45-53), filed on behalf of Tampa Electric Company, has been furnished by U. S. Mail or hand delivery (*) on this 25th day of September 2007 to the following:

Ms. Katherine Fleming*
Mr. Keino Young
Senior Attorneys
Florida Public Service Commission
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Hearing Exhibit - 000075

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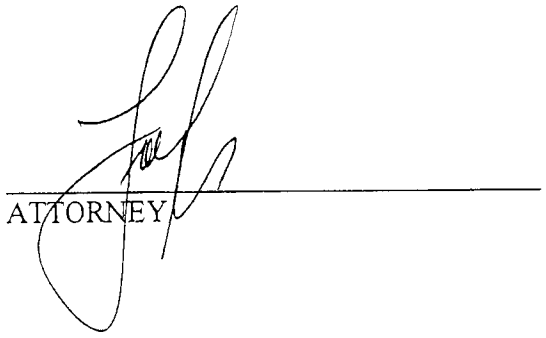

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GCL

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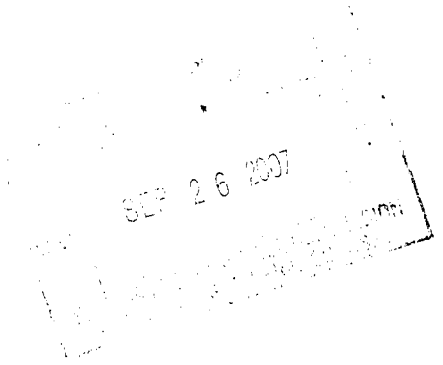
September 25, 2007



HAND DELIVERY

Ms. Ann Cole, Director
Commission Clerk and Administrative Services
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Re: Docket No. 070297-EI; Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code submitted by Tampa Electric Company

Dear Ms. Cole:

Enclosed herewith for filing are the original and one (1) copy of Notice of Service of Answers to Second Interrogatories (Nos. 45-53) of the Florida Public Service Commission Staff, propounded and served by electronic and U. S. Mail on September 5, 2007.

Please acknowledge receipt and filing of this document by stamping the duplicate copy of this letter and returning same to this writer.

Thank you for your assistance with this filing.

Sincerely,

Lee L. Willis

LLW/bjd
Enclosures

cc: All Parties of Record (w/encls.)

DOCUMENT NUMBER-DATE
08793 SEP 25 07
FPSC-COMMISSION CLERK

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BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of:

REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY TAMPA ELECTRIC COMPANY.	DOCKET NO. 070297-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY PROGRESS ENERGY FLORIDA, INC.	DOCKET NO. 070298-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY GULF POWER COMPANY.	DOCKET NO. 070299-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY FLORIDA POWER & LIGHT COMPANY.	DOCKET NO. 070301-EI

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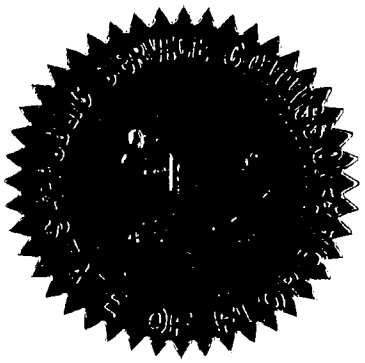

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A CONVENIENCE COPY ONLY AND ARE NOT
THE OFFICIAL TRANSCRIPT OF THE HEARING,
THE .PDF VERSION INCLUDES PREFILED TESTIMONY.

TELEPHONIC
DEPOSITION OF: REGAN B. HAINES

TAKEN AT THE
INSTANCE OF: The Staff of the Florida
Public Service Commission

FLORIDA PUBLIC SERVICE COMMISSION

PLACE:	Room 362 Gerald L. Gunter Building 2540 Shumard Oak Boulevard Tallahassee, Florida
TIME:	Commenced at 1:00 p.m. Concluded at 5:23 p.m.
DATE:	Tuesday, September 18, 2007
REPORTED BY:	JANE FAUROT, RPR Official FPSC Reporter (850) 413-6732

FLORIDA PUBLIC SERVICE COMMISSION

APPEARANCES:

LEE L. WILLIS, ESQUIRE, Ausley Law Firm, Post Office Box 391, Tallahassee, Florida 32302, appearing on behalf of Tampa Electric Company.

JOHN SEIVER, ESQUIRE, and MARIA T. BROWNE, ESQUIRE, Davis Wright Tremaine LLP, 1919 Pennsylvania Ave., NW, Suite 200, Washington, D.C. 20006, appearing on behalf of Florida Cable Television Association.

DULANEY L. O'ROARK III, GENERAL COUNSEL, Southeast Region Verizon, 6 Concourse Parkway, Suite 600, Atlanta, Georgia 30328, appearing on behalf of Southeast Region Verizon.

JENNIFER KAY, ESQUIRE, 150 West Flagler Street, Suite 1910, Miami, Florida 33130, appearing on behalf of AT&T.

KATHERINE FLEMING, ESQUIRE, FPSC General Counsel's Office, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850, appearing on behalf of the Commission Staff.

Hearing Exhibit - 000081

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EXHIBITS

NUMBER:		ID.
1	(Late-filed) Rate Impact of Hardening Initiatives and Proposed Hardening Plan	14

Hearing Exhibit - 000083

S T I P U L A T I O N

IT IS STIPULATED that this deposition was taken pursuant to notice in accordance with the applicable Florida Rules of Civil Procedure; that objections, except as to the form of the question, are reserved until hearing in this cause; and that reading and signing was not waived.

IT IS ALSO STIPULATED that any off-the-record conversations are with the consent of the deponent.

Hearing Exhibit - 000084

P R O C E E D I N G S

MS. FLEMING: Okay. Is everyone ready to go?

MR. WILLIS: We're ready to go at this end.

MS. FLEMING: What I would suggest for the court reporter is let's go ahead and just take appearances on the phone. We just really need to know who is on the phone and who they are representing.

MR. WILLIS: I'll start. I'm Lee L. Willis, P.O. Box 391, Tallahassee, Florida, appearing on behalf of Tampa Electric Company.

MS. BROWNE: Maria Browne, Davis Wright Tremaine Law Firm, and it's 1919 Pennsylvania Avenue, NW, Washington, D.C. 20006, appearing on behalf of FCTA.

MR. SEIVER: John Seiver of the same law firm, and for FCTA, as well.

MR. O'ROARK: De O'Roark, the first name is spelled D-E, last name, O-'-R-O-A-R-K, representing Verizon. It's 5055 North Point Parkway, Alpharetta, Georgia 30022.

MS. KAY: Jennifer Kay, K-A-Y, with AT&T Florida, at 150 West Flagler Street, Suite 1910, Miami, Florida 33130.

MS. FLEMING: Is that everyone on the phone? I think so.

This is Katherine Fleming on behalf of the Commission. I think we're ready to get started, so I'll have the court reporter swear in the witness.

Hearing Exhibit - 000085

(Witness sworn by the Court Reporter.)

REGAN B. HAINES

was called as a witness and, after being duly sworn by the court reporter, testified as follows:

DIRECT EXAMINATION

BY MS. FLEMING:

Q Good afternoon, Mr. Haines, how are you?

A Good. How are you?

Q I'm good, thank you. Sorry for the delay in starting your deposition. Hopefully we will be able to move through this fairly quickly.

Before we get started, I just want to make sure that you do have a copy of your testimony and exhibits with you.

A I do.

Q Do you have any other items with you today?

A Yes. I have quite a few items. I've got, let's see, my testimony, response to interrogatories, production of documents by FCTA and Staff, various testimonies by FCTA, Progress Energy, Florida Power and Light, Verizon, our wood pole inspection program, the ten-year -- our ten-point plan that we filed, and a copy of the National Electric Safety Code. That's about it.

Q Thank you. And, also, just as a preliminary matter, when I do ask questions if you need clarification or you don't understand the terms that I use, please let me know and we can

Hearing Exhibit - 000086

rephrase or work through that question together, okay?

A Okay.

Q Let's go ahead and get started.

Please state your name and business address for the record?

A Regan Burton Haines, and I'm at 2200 East Sly Avenue, that's Tampa, Florida 33610.

Q And you're employed by TECO?

A Tampa Electric Company.

Q And what is your position with Tampa Electric?

A I am Director of Engineering for Energy Delivery.

Q And did you file testimony in this docket, Direct Prefiled Testimony consisting of approximately, I believe, 25 pages?

A Yes, I did.

Q And you also filed Rebuttal Testimony in this docket?

A That's correct.

Q And at this time, do you have any deletions or corrections to your prefiled testimony?

A No, I do not.

Q Let me have you turn to Exhibit RBH-1 in your Direct Prefiled Testimony, please, and I'm looking specifically at Document Number 2?

A Okay.

Q And I'm looking at the column that's under the

Hearing Exhibit - 000087

estimated benefits to utility customers, there is a column that is titled "Impact on Storm Restoration Costs"?

A Right.

Q Do you see that?

A Yes.

Q Well, actually, let me backtrack. This chart that we are looking at under Document 2, can you describe this document for us, please?

A What we included in this document is our actual and estimated costs for each of the activities listed. Our wood pole inspection program, all the items in the ten-point plan that was filed, as well as the additional storm hardening items that we included in our three-year storm hardening plan. And then we made several assumptions to come up with estimated impact on benefits when it comes to storm restoration costs, as well as what any day-to-day operational benefits might be. The impact on storm cause outages, we were not able to quantify that in the time period that we had as well as impact to third-party attachers.

Q Okay. And on the column that is titled "Impact on Storm Restoration Costs," are the cost amounts TECO's estimates of the reductions in storm restoration costs?

A That's correct, based on the assumptions that we made, and I think that was also attached as part of that exhibit.

Hearing Exhibit - 000088

Q And I notice that there are several columns that have amounts reflected as zero, is that because TECO believes that there are no reductions in storm restoration costs?

A That's correct.

Q And a few moments ago you also mentioned the actual/estimated utility costs. Do those columns represent the costs TECO is projecting to incur?

A Those are the total costs or expenses that we are anticipating incurring, correct.

Q So when TECO incurs storm restoration costs, does TECO charge those costs against the storm reserve?

A We have in the past, yes.

Q And so to the best of your knowledge, is TECO's storm damage reserve a component of its base rates?

A I do not know the answer to that question.

Q Well, you stated previously in the past whenever TECO incurs storm restorations costs it charges those costs against the storm reserve. So if storm hardening is successful, would you expect a reduction in the storm reserve components, assuming that the storm reserve component is charged to base rates?

A Assuming that all of these assumptions held true, then you could deduce that that would have a benefit to the storm reserve.

Q Okay. Thank you.

Hearing Exhibit - 000089

On that same exhibit you have Line Items A through K along the left-hand side of that page, do you see that?

A Yes.

Q Did TECO previously file its plan addressing these line items?

A Yes, we did.

Q And did the Commission approve the implementation of TECO's plans for the line items in a prior proceeding?

A Yes, they did.

Q And did the Commission find that TECO's plan, if implemented, was reasonably expected to achieve reduced storm restoration costs and reduced outages to affected parties?

A I believe that was the assumption when it was approved, yes.

Q And when this was approved, did TECO or the Commission use a benefit-to-cost ratio to determine the cost-effectiveness of the plan for each line item?

A I do not believe so at the time.

Q So the bottom line is the Commission did approve TECO's plan without a benefit-to-cost ratio?

A That's my understanding.

Q Okay. Thank you.

Would you agree that the objective of the Storm Hardening Rule, Rule 25-6.032, is to reduce the storm restoration costs and storm caused outages?

Hearing Exhibit - 000090

A Yes.

Q What is the estimate of the total incremental cost for the previously approved hardening initiatives, do you know off the top of your head?

A Can you restate the question?

Q In the previous hardening initiatives that were approved by the Commission there was an estimate of the total incremental cost. What was that total cost for those initiatives?

A For Tampa Electric, I believe the three-year average is roughly $16 million, give or take a year.

Q And has Tampa -- I'm assuming Tampa Electric has estimated a total incremental cost for the company's proposed hardening plan in this docket?

A Yes, that would be the remaining cost.

Q And do you have a dollar amount for that?

A It's roughly $2 million a year, maybe a little bit under that. I'm looking at the numbers right now, maybe 1.3 million on average.

Q And, if you know, what is the incremental cost for both, for the approved initiative and the proposed hardening plan as a rate impact per one thousand kilowatt hours?

A I don't have the rate impact numbers available.

Q Could we get a late-filed exhibit showing that?

A Yes, we can prepare that.

Hearing Exhibit - 000091

MS. FLEMING: Let's label that Late-filed Exhibit Number 1, and we could title it as "Rate Impact of Hardening Initiatives and Proposed Hardening Plan."

(Late-filed Exhibit 1 marked for identification.)

THE WITNESS: And that is of all the initiatives, the impact due to the inspection program, the ten-point plan and the storm hardening plan?

MS. FLEMING: Yes. But we would like them separate so we can have a side-by-side comparison. So what was approved with the Commission previously with the initiatives, and then a separate one with the proposed hardening plans.

THE WITNESS: Okay.

BY MS. FLEMING:

Q Are we ready to move on?

A Yes.

Q Would you agree that the initiatives that we have been talking about, the previously approved initiatives were mostly annual system-wide activities?

A That's where the majority of the dollars are spent in the effort, yes.

Q Therefore, would you agree that the proposed hardening plan in this docket is a three-year projection that is subject to change as more information is gathered and costs are refined?

A Yes, it is.

Hearing Exhibit - 000092

Q So based on your responses, would you agree then that the previously approved hardening initiatives and the hardening plans in this docket are complementary to each other?

A Yes, they are.

Q Would you agree that the company is responsible for pursuing the most cost-effective hardening projects?

A Yes.

Q Would you agree that the Commission expects each utility to prudently manage its resources?

A Yes, I do.

Q Okay. Now, you stated earlier you do have testimony in front of you by Witnesses Smith of AT&T and Walker of Verizon, is that correct?

A Yes, that's correct.

Q The next few questions will deal with those two witnesses' testimony, and I can direct you to the page and line number. The first witness we will be dealing with is AT&T Witness Smith.

A Okay.

Q And I'm looking specifically on Page 3, starting on Lines 14 through 17. And to paraphrase, Witness Smith states that TECO as well as the other utilities have agreed to the third-party attacher process, is that correct?

A That is correct.

Q As you know, there has been a revision to the

Hearing Exhibit - 000093

third-party process. Has TECO agreed to the revised third-party attacher process?

A Yes, we have.

Q In its plan TECO included some preliminary cost/benefit data it had collected from third-party attachers. And since the time that the plans were filed, several meetings and workshops have been held for the purpose of explaining the plans or exchanging information with all parties. Has TECO made any attempt to update the third-party attachers cost/benefit information that has been filed in the plan?

A To my knowledge we have not received any cost or benefit information from the third parties.

Q You just stated that -- I asked you if TECO had made any attempt to update the third-party attachers cost/benefit information, and you stated that you had not received any information from the third-party attachers, correct?

A That's correct. We have worked with them at several meetings and conference calls and exchanged information regarding our projects and our plan, but we have not received from them exactly what they need to complete that or any preliminary numbers when it comes to cost/benefits for their facilities for their systems.

Q So in order for TECO to update any cost/benefit data, you're relying on information from the third-party attachers?

A Yes, we are.

Hearing Exhibit - 000094

Q Did TECO's plan that you filed with the Commission include the cost/benefit data from all affected third parties in your service area?

A We exchanged information with all of our third-party attachers, yes.

Q Now I want to speak just briefly about TECO's pole joint use agreements with the third-party attachers. In general, TECO's pole joint use agreements with third-party attachers, currently it's my understanding that they assign financial responsibility when a pole is overloaded or when an attachment is unauthorized, is that correct?

A That is my understanding, yes.

Q Now, let me have you turn to Verizon's Witness Walker's testimony, please.

A All righty.

Q I'm looking specifically on Page 4, Lines 7 through 11. And Witness Walker states that TECO's plan should not be approved in its current form because it imposes certain pole attachment conditions on attachers rather than following the parties' existing joint use agreements.

A Right.

Q Do you agree with that statement?

A I guess I agree that there are certain terms and conditions that we have in our contracts or agreements that we included in our joint use attachment standards and procedures

Hearing Exhibit - 000095

document.

Q Okay. Now, are you familiar with the -- the joint use agreement that Mr. Walker is referring to, is TECO imposing some terms and conditions that are in conflict with their current existing agreements?

A I do not believe there is anything that we included in our attachment standards and procedures that are in conflict with our contractual arrangements.

Q Okay. If you know, to the best of your knowledge, what is the date of that agreement, the joint use agreement?

A One we have with Verizon is actually a GTE agreement, I believe, from the 1960s, and we have been attempting for the last several years to renegotiate that agreement, but we have not been able to this point. And the other agreements that we have with our cable companies are made up of several agreements from the smaller cable companies from back in the 1970s.

Q Okay. Now, you stated that you have been attempting to renegotiate the agreements with Verizon, is that correct?

A With all of our attachers, but, yes, with Verizon, as well.

Q And you have not been able to reach some sort of agreement, why is that?

A I guess just being able to come to an agreement on a new contract and get the right parties to the table, and this has not moved along as quickly as we would like.

Hearing Exhibit - 000096

Q Let me have you turn to Page 5 of Witness Walker's testimony starting on Line 20. Witness Walker states that Verizon is concerned that TECO may attempt to claim a Verizon attachment which was within the loading requirements for a Grade C pole is responsible for overloading the pole when Grade B criteria are applied retroactively. Can you comment on this situation?

A The position that we have taken, and it's reflected in our responses to, I think, several of the interrogatories is if there is a pole out there that does not meet our current standard of Grade B, which was implemented back in the 1970s, and it's something less than that, yet all of the attachers that are on there are permitted to be there, Tampa Electric Company is going to upgrade that pole to Grade B, the current standards at its own cost. Yet if there are attachers that are on that pole that have not permitted to be there, we would look to receive compensation for those third-party attachers to make sure that that pole is in compliance. So they would be responsible at that point to bring that pole up to Grade B, which, like I said, is the company's current construction standards.

Q So then you are saying that there are some poles that are based on standards from the 1970s, is that correct?

A That's when the company implemented its construction standards and moved to Grade B as kind of the basis for the

Hearing Exhibit - 000097

loading criteria on the pole.

Q So if Tampa Electric has currently today some poles that are not at the Grade B criteria, does TECO plan to retroactively apply the Grade B criteria to those poles?

A Well, when those poles are inspected, and if they do not meet the company's construction standards, we would upgrade it to the standards at that time.

Q Okay.

A I'm not sure if that answered your question, but maybe you could rephrase it.

Q Okay. And as a follow-up to that, hypothetically speaking, let's anticipate that a situation were to arise where TECO and Verizon could simply have a different view or calculation about the load on a pole. For example, if one party was stating that the pole was overloaded and the other one was saying it was not. Can that happen in this situation; is that a scenario that could arise?

A I guess it could arise if you are using different techniques or software tools to do the analysis and using different assumptions, but we would intend to work with the third-party attacher at that point to try to come to some kind of consensus on the methodology and the approach.

MS. FLEMING: Let me go back through my notes for a moment and let me see if I have anything else for you.

(Off the record.)

Hearing Exhibit - 000098

BY MS. FLEMING:

Q All right. Looking back, we were discussing the pole and the criteria for Grade B, and upon inspection you would go back and upgrade certain poles. And you mentioned something about permitted versus nonpermitted attachers, is that correct?

A That's correct.

Q Can you explain to me the process again as far as the allocation of cost on when you upgrade the poles versus the permitted and nonpermitted attachers?

A Okay. We are looking at upgrading the poles to Grade B. When we are completing our pole inspection process we do a loading analysis on the pole as part of that inspection process, and if the pole fails to meet the loading requirements based on Grade B, then we would upgrade that pole, whether it's to change the pole out, add additional guying, whatever is needed to make sure that pole is complying with Grade B loading criteria. Then we would look to see who is causing the overload. If all of the attachers that are attached to that pole are permitted -- and when I say permitted, they had filled out an application seeking approval to attach to our poles, which is part of our contractual agreements with the third-party attachers -- then the pole had become overloaded due to some other reason or an oversight on Tampa Electric's part, then Tampa Electric would pay all the costs associated with upgrading that pole.

Hearing Exhibit - 000099

In the scenario where there are an attacher or attachers on that pole that have not permitted or applied for approval to attach to that pole and they are the ones that are causing the overload on the pole, then we would seek to allocate the costs to those third-party attachers, or give them the option to seek an alternative way to route their facilities.

Q When you talk about you would seek a way to allocate those costs, would you allocate a portion of those costs or the total cost of what it would cost TECO to upgrade the pole?

A If the total overload is completely, you know, attributed to those third-party attachers, then the total cost would be allocated. If it's shared, if the overload portion is shared across those attachers and Tampa Electric, then it would be proportioned appropriately.

Q Proportioned appropriately based on the load, who is causing the load overload?

A Based on the percentage of overloading or the contribution, yes.

Q Now, could a situation arise that you have one unpermitted attacher on there and a permitted attacher on one pole?

A Yes.

Q And what would happen in that situation if there is an overload being caused, and say you determined it is the

permitted attacher that is causing the overload. How would you deal with that scenario? I mean, would you allocate any cost to this unpermitted attacher when they are not the cause of the overload?

A I think we would seek to go back and -- I'm just kind of thinking through this and working through it -- go back to that attacher that is not permitted and have them go through the application process, and then work with them on any back rental issues trying to determine when they attached. But as far as allocating costs, no costs would be allocated to that attacher that was permitted. I'm having a hard time thinking through that scenario.

Q I know. And it's just something that I just came up with off the top of my head. It's more curiosity than anything else.

A Yes, I'm not sure.

Q Okay.

A We work on it on a case-by-case basis. And just like we have -- we do this as part of our day-to-day operations, as well, work with the attachers to determine who's approved to be on the pole, who is causing the overload and work through them on the cost allocation issues.

MS. FLEMING: Okay. Well, Mr. Haines, those are all the questions we have, so I appreciate your time this afternoon.

Hearing Exhibit - 000101

THE WITNESS: You're welcome. Thank you.

MR. O'ROARK: This is De O'Roark with Verizon. I could go next.

FCTA has questions, too. If you all would like to go first, that would be fine.

MS. BROWNE: De, that's fine. Please go ahead.

CROSS EXAMINATION

BY MR. O'ROARK:

Q Good afternoon, Mr. Haines. I'm De O'Roark and I represent Verizon. I have just a few questions for you this afternoon.

The first thing I would like to do is try to understand the interrelationship of three pieces of your testimony. So bear with me and let me refer you to three pieces. The first is your direct, Page 23, Lines 7 through 10. I'll give you a moment to get there. Let me know when you are there, please.

A Okay. I'm there.

Q There you list several sections of the plan, including Sections 8.7 and 8.8, and say that they set out the attachment standards and procedures for which Tampa Electric seeks approval in this proceeding. Is that correct?

A That is correct.

Q Now, let me ask you to flip -- keep that section open and flip to your rebuttal, Page 7, starting at Line 9. And

Hearing Exhibit - 000102

just let me know when you are there, please.

A Okay.

Q You were asked about the relationship of the storm hardening plan, the pole inspection plan, and the ten-point initiative. And in response -- and I'm paraphrasing -- you state that the plan references the pole inspection and pole attachment programs to show consistency with the storm hardening plan's intent to harden TECO's system. But you go on to note that those programs are separate from the plan, is that a fair paraphrase?

A Yes, they are tied together. You know, it's all part of storm hardening and what we are trying to accomplish. I think like what was said earlier, the pole inspection program and the pole attachment audit which was part of the ten-point plan have previously been approved by the Commission. But in order to make it a complete attachment standards and procedures document, because they do involve the attachers, we included it as part of that procedures document.

Q Okay. And one other reference. If you can look at your rebuttal, Page 11, Lines 17 and 19, please. Do you see that?

A Yes.

Q You state that the pole attachment audit program was previously approved by the Commission and the discussion of Section 8.8 was included for completeness. Do you see that?

Hearing Exhibit - 000103

A That is correct, yes.

Q My question is, is TECO requesting approval of Section 8.8, or just providing it for informational purposes?

A I guess that is confusing. It is included for completeness. I don't think we need approval because it has already been approved.

Q Are you requesting approval by the Commission in this docket of Section 8.8?

A No. Like I said, it has already been approved the way we view it, so we are not necessarily seeking approval again.

Q The same question for Section 8.7.

A The same for that, yes.

Q And to the extent that Section 7.5.1 discusses the pole inspection and pole attachment programs, would your answer be the same?

A To the extent that it addresses those two items, yes.

Q Let me refer you to Exhibit RBH-1 to your direct testimony, and ask you to turn to Page 48. And just let me know when you are there, please.

A Okay.

Q In looking at Section 8.7, one of the requirements there would be that if the party responsible for overloading a pole does not have a permit to be on the pole, the attacher would have the choice to remove its attachments or pay for

Hearing Exhibit - 000104

corrective action; is that right?

A That's correct.

Q Now, I think you have already said that it is your understanding that the PSC has already approved that requirement in another docket, correct?

A It has approved the pole inspection program and the comprehensive pole loading analysis piece of that. I think this gets into a little bit more detail than what was filed as part of the pole inspection program.

Q Let's take it one step at a time. Is there anything you can cite me to, any order that specifically approves this requirement in Section 8.7?

A No, I cannot.

Q Is there anything in your pole inspection plan that was filed with the Commission that has that requirement in it? And I believe that was one of the documents you said you had in front of you?

A Yes. And that is a high level document. So as part of the completeness we tried to expand on the details behind that.

Q Okay. And let's make sure that we are looking at the same document. I've got something that is dated revised November 13th, 2006, Tampa Electric Company wood pole ground line inspection program. Is that what you are looking at?

A That's what I have; yes, sir.

Hearing Exhibit - 000105

Q Okay. And I guess it has got eight pages, but four numbered pages?

A Right.

Q Is there anything in this document that has the requirement that if the party responsible for overloading the pole doesn't have a permit to be on the pole, the attacher will have a choice to remove its attachments or pay for corrective action?

A No, it doesn't get into that level of detail.

Q Is there anything else that does get into that level of detail that authorizes TECO's action or proposed action?

A Other than if it's specifically mentioned in a joint use agreement or a pole attachment agreement, no.

Q Just so I'm clear, when you say that the Commission has already approved the requirement, what did you mean?

A The requirement to perform a pole loading analysis on joint use poles and the requirement to perform ground line pole inspections and the requirement to perform a pole attachment audit.

Q Higher level matters, not the specifics?

A I believe it was an order did not get into the detailed specific requirements, but was at a higher level. And as you saw, the pole inspection program that we filed was at a higher level, as well.

Q So to your knowledge the Commission has not

Hearing Exhibit - 000106

specifically approved the requirement that the attacher either remove its attachments or pay for corrective action under these circumstances?

A I would believe that the Commission would fall back on the contractual agreements on that, yes.

Q Let me ask you to turn the page, and go to Page 49 of RBH-1. In Section 8.8 there are a number of requirements that I want to go over with you. The first one is that if TECO finds unauthorized attachments, TECO reserves the right to backbill to the last audit unless the attacher provides a permit for the attachments. Do you see that?

A Yes, I do.

Q Okay. The same kind of questions for you. Is it your understanding that the PSC has already approved that specific requirement in some other docket?

A Not that specific requirement, no.

Q And then let's look at the requirement that unauthorized attachment fees will be assessed. Has the Commission previously approved that specific requirement?

A No, they have not.

Q And then, finally, the requirement that an attacher must pay for an engineering study and any corrective action. Has the Commission approved that specific requirement?

A Not to my knowledge, no.

Q Now, I believe you said you have got your ten-point

Hearing Exhibit - 000107

plan in front of you. Are those specific requirements in the plan to your knowledge? Do you need a moment to look at the plan?

A Yes. I was just pulling up the plan, if you could bear with me just a second.

Q Certainly. Take all the time you need. Perhaps you can take a look at it and then we will go through those points one by one.

A It does address the ten-point plan looking on Page 9, which is part of Initiative 2 on pole attachment audits. The approach that would be taken when establishing an attachment date for an attachment that was unauthorized using our 2001 audit as a baseline.

Q And the assumption would be that the attachment was placed as of the 2001 audit, or if the pole was put up after that, then the date the pole was put up?

A That's correct.

Q Do you see anything in the ten-point plan that gives TECO the right to backbill to the last audit unless the attacher provides a permit for the attachments?

A Not specifically, no.

Q Is there anything in the ten-point plan that would allow TECO to assess unauthorized attachment fees to attachers?

A Not specifically, no.

Q And then the same question for the requirement that

Hearing Exhibit - 000108

an attacher must pay for an engineering study and any corrective action?

A It addresses that to some degree in the paragraph at the top of Page 9 when it talks about the occurrence of unauthorized attachments or overloaded conditions. In the event an overload has been found, the company will work with the attaching party to address the overload.

Q It doesn't specifically say that the attacher must pay for an engineering study and any corrective action, does it?

A No, it doesn't get into the details.

Q Would you expect those kinds of terms and conditions to be dealt with in the parties' joint use agreements?

A Like I was saying earlier, our agreements are so old that I'm not sure it's the level of detail that is specifically referenced in the contracts, but I believe they should be in the contractual agreements that we have with our attachers, yes.

Q You were asked before if the -- I believe you were asked if the attachment standards were in conflict with the joint use agreements. Do you recall that question?

A Yes, I do. And to the best of my knowledge they are not in conflict with our application or the language that's in our agreements.

Q Do your joint use agreements include all of those

Hearing Exhibit - 000109

attachment standards?

A Not all of the standards, no.

Q And, for example, do they include the requirements that we just discussed?

A The agreements might -- I don't know if the agreements specifically include all of those details. But to my knowledge, the way that we have conducted business and dealt with our attachers, it's consistent with practice.

Q Let me ask you to take a look at Page 7 of the ten-point plan, if you still have that in front of you?

A Yes, I do.

Q And do you see the paragraph headed "joint use agreements"?

A Yes.

Q Wasn't the way that TECO planned to implement these changes by going through its -- or by making amendments to its joint use agreements?

A I'm not sure if I understand the question.

Q Yes, that was not well-phrased. Let me try again.

Didn't TECO plan to implement this aspect of its ten-point plan through its joint use agreements?

A I believe that we at the time felt that we could implement and execute this plan, this ten-point plan through our current joint use agreements.

Q And that was a plan the Commission approved?

Hearing Exhibit - 000110

A Yes.

Q Let's switch gears for a minute and talk about the transition from Grade C to Grade B. I gather that TECO still has poles out in the field that meet the Grade C criteria and not Grade B, is that true?

A We know that based on the loading analysis that we have done since we have started the eight-year wood pole inspection program with the pole loading analysis that the percentage -- a certain percentage of the poles are failing to meet Grade B. Whether they meet Grade C or fail to meet Grade C, I do not know, but they are not meeting our current construction standards of Grade B.

Q You said that you moved to Grade B in the 1970s?

A That's correct.

Q Did TECO use Grade C before that?

A I believe so, yes.

Q Do you know if any of those pre-1970s poles are still out there engineered to Grade C?

A There are poles out there pre-1970. Pre-1970s, yes.

Q Is there any way to tell which poles out there were originally designated Grade C and which Grade B?

A Not really without going out and engineering and doing a pole loading analysis on them, because they could be before we switched to Grade B, but they still might meet Grade B. It depends on what's attached to the pole and, you know,

what the loading is on the pole.

Q How long has TECO been replacing Grade C with Grade B poles?

A Well, we just recently started doing the pole loading analysis as part of the pole inspection program, but previously whenever we would change out a pole through our pole inspection program, or relocation, road widening, we were using the rule of thumb or guidelines that have been discussed for the new construction, and that new construction is based on Grade B. And that has been done since we switched to the Grade B criteria.

Q I'm not sure I caught the answer. I had asked how long TECO has been replacing Grade C poles with Grade B. Do you have a date certain or an approximate?

A It is really not a date. Like I said, since we switched to Grade B in the 1970s, any time we would replace a pole for whatever reason, we would move to Grade B construction.

Q And is that what you are still doing today?

A We are still doing that today. The difference is we have software tools that allow us to quickly analyze the exact loading on a pole and can get us a lot more precise as far as what size pole do we need to go back with in order to meet Grade B. Whereas, prior to -- actually, earlier this year when we implemented Pole Foreman we were using those guidelines.

Hearing Exhibit - 000112

Q Is it fair to say that you began to replace Grade C with Grade B poles in a systematic way when you started your pole inspection plan?

A I wouldn't say systematic. I would just say it's more detailed engineering analysis behind each of the replacements.

Q If an attacher has a permit, does TECO assess any pole replacement charge when a Grade C pole is changed to Grade B?

A Not if the attacher has a permit, no.

Q And if attacher does not have a permit, does TECO assess any pole replacement charge when a Grade C pole is changed to Grade B?

A Yes. We're breaking new ground here, but our position has been if the attacher does not have a permit and is identified to be causing the overload, then we would look to allocate either all the costs or a portion of the costs to the attacher that's causing the overload that is on there without, you know, going through the application process.

Q Let's assume we have got, you know, a pre-1970s Grade C pole, and it has always been a Grade C pole and all the attachments taken together meet the Grade C criteria, okay? Are you with me so far?

A Yes.

Q And TECO inspects the pole, sees that it meets the

Hearing Exhibit - 000113

Grade C criteria, but is going to upgrade the pole to Grade B; and based on Grade B criteria, the pole fails. Does that make sense?

A Yes.

Q And let's assume one of the attachments is unauthorized, or at least TECO has concluded that it's unauthorized. Under those circumstances, are you going to make that unauthorized attacher pay to replace the pole?

A It's unauthorized, it has been there. Well, the pole has been there since the 1970s, but we don't know when the attachers have been there. So, you know, for example, in that scenario, if one of those attachers that's unpermitted attached two years ago, if they would have permitted we would have done the make ready at that time and upgraded it to Grade B. So, in essence we are now just doing the make ready that would have been assigned to that third-party attacher at the time they applied for approval to attach to the pole.

Q So if the attacher would have applied two years ago, say, TECO would have done the make ready work?

A Correct.

Q And you're saying since the attacher didn't apply, now it has got to do the make ready work that TECO would have done?

A It has got to do the make ready work that it would have done when it applied, because Grade B was in effect two

years ago.

Q You are saying that had the attacher applied, TECO would have said you can attach, but only if you do the make ready work to upgrade it to Grade B?

A That's correct. Without a permit we have no way of knowing when the attachers attached.

Q To your knowledge has the PSC approved that requirement?

A No, because the details that we are discussing here has not been included in any of the approved filings.

Q So is TECO requesting authorization for that requirement in this storm hardening docket?

A I think it's related to storm hardening in the sense that it incents attachers to make sure that they are seeking approval and going through the application process so the pole can be engineered to accommodate all the attachments. So in that sense I think it is tied to hardening, and it's something that if the Commission did approve would be beneficial to our storm hardening initiatives.

Q Let me take one more shot. Are you, TECO, requesting the Commission to approve this requirement in this docket?

A Restate the requirement one more time that you are specifically referring to.

Q Yes. The one we were talking about, that the unauthorized attacher has got to pay the make ready costs when

Hearing Exhibit - 000115

a TECO inspection finds that the pole does not meet Grade B criteria, even if the pole previously had been a Grade C pole?

A That specific requirement we are asking the Commission to approve, yes.

MR. O'ROARK: Mr. Haines, that is all I have. Thank you.

THE WITNESS: Thank you.

MS. BROWNE: If it is okay we will go on. Maria Browne for FCTA. Or should we take a little break?

MR. WILLIS: Let's take five minutes.

MS. BROWNE: Sounds great.

(Recess.)

CROSS EXAMINATION

BY MS. BROWNE:

Q Mr. Regan, Maria Browne. I hope you're doing good.

A Very well, thank you.

Q I will try not to go back over too much of the same material, but I might just do that for some background. I do want to cover some of the same subject areas, but I'm hoping that I will ask you different questions.

A Okay.

Q Do you have Tampa Electric's answers to FCTA's first set of interrogatories?

A Yes, I do.

Q Can you refer to Item Number 22.

Hearing Exhibit - 000116

Are you there?

A I'm there.

Q At the bottom of that answer it states that where the third-party attacher is not able to provide an approved application to attach by the company, and, likewise, the company is not able to find an approved application to attach, it is assumed that the attaching party assessed with the overload did not have an authorized attachment. Can you please explain this answer?

A What that is intending to convey is if the attaching party cannot -- I mean, we're going to do everything we can to look through our records and produce a permit or an application for a permit for that attachment. But if we cannot produce it, the burden falls back on the third-party attacher. And if the third-party attacher cannot produce a permit, then based on our experience, we're going to assume that -- we are going to have to make the assumption that that third-party attacher did not go through the application process. And so they would not have authorized attachment (inaudible) responsible so they would have cost responsibility to perform the make ready. At that time that we believe if they would have went through the application process that that make ready would have been done at the time they went through the application process.

Q Can you please describe the records that TECO has kept of third-party attachments and the approved applications?

Hearing Exhibit - 000117

A My knowledge prior to -- we have records prior to 2001. They are archived records at a records retention facility. But in 2001 we started a larger more formal joint use department, and since then we probably have more complete records of our attachers since that time. But we do have records prior to that, they are just harder to get access to.

Q And the records prior to 2001, would you describe those as incomplete?

A Well, I would describe them as paper copies, and there is -- I don't know if they are less complete, they are not as maybe detailed as some of the databases and different technology that we started using in 2001, so they are more easily accessible given that they are in an access database.

Q Is it possible that there would be an attachment on a pole that was made prior to 2001 for which no record would exist in TECO's archived database?

A It's possible.

Q In that instance you would ask the attaching entity to produce a copy of the record?

A Yes.

Q And if the attaching entity couldn't produce a copy of the record, the attaching entity would be deemed to have an unauthorized attachment?

A That's correct.

Q But it's possible that, in fact, that attaching

entity had received approval to be on that pole?

A It's possible.

Q In that same answer to interrogatory you state that it is always assumed that the company, referring to TECO, was the first attacher on the pole, and this is actually stated because you were explaining that you will use the order of attachment as a way to assign responsibility for an overload?

A Right.

Q Do you agree that Tampa Electric may actually have been the last company to attach to a pole?

A The electric company could be the one to last add an attachment to the pole if it's a piece of equipment or something like that, but we have records of that, as well.

Q Are your records as complete prior to 2001 for that as they are for after 2001?

A Yes. For our facilities we have different databases, facilities information management systems, and GIS systems that have our records more complete.

Q So, could you explain how you would work through that presumption in that instance? The presumption would be that TECO was the first one on the pole, but your records actually indicate that they were not?

A Yes. This is a very high level generalization of the approach, but on each, you know, situation case-by-case basis the joint use department would work with the attachers on that

Hearing Exhibit - 000119

specific pole that is overloaded to determine, you know, the timing of the attachments and who the causer and cost responsibility party should be.

Q Other than the timing of the attachment, what factors are considered in assessing responsibility for the overload?

A I don't know the details specifically and whether it would come down to the percentage of overload that's being contributed by each party. That is one way that we could do it. But I would have to look at the -- I would have to talk to the joint use department to get the details on how that is implemented.

Q Okay. I just want to clarify, you said percentage of overload. Did you mean the loading impact?

A The loading impact, right.

Q And typically the power company has the greatest load on the pole, is that correct?

A That's correct.

Q In determining whether an attachment is authorized or unauthorized, will TECO take into account the fact that an attacher has been paying rent on the attachment if it does not have a permit? If it cannot produce a paper record, will TECO take into consideration the fact that the attacher has been paying rent on the attachment?

A Take into consideration in what fashion?

Q Would that be evidence that the attachment is

Hearing Exhibit - 000120

authorized?

A Not necessarily, because we did the pole audit in 2001 and trued everything up from a rental standpoint, and we have records now of who was on a given pole as of 2001. But at that time we did not do a pole loading analysis on those poles to see if they were within compliance. So, in essence, make ready was never accomplished for those poles, or never performed for those poles, for those attachments. But from a rental standpoint, everything was trued up as of 2001.

Q Right. Okay. So in 2001, you said there was a substantial number of unauthorized attachments that were found, you said that earlier?

A That's correct.

Q And back rent was paid for those attachments?

A Right.

Q And you have known about those attachments now for about six years?

A Yes.

Q And notwithstanding the fact that TECO has known about those attachments for six years, you would nevertheless assign responsibility for make ready to the attaching entity?

A Yes.

Q Can you explain the rationale for that?

A Well, like I said, if the application process would have been followed at the time the attachment was made, then

Hearing Exhibit - 000121

make ready would have been performed.

Q But it's possible that, in fact, there was an application process, but this is an older attachment and the records have been lost, in that instance?

A In that instance we believe the burden falls back on the third-party attacher to produce the permit, and I believe that's even contractual in some of our agreements.

Q To the extent it is contractual and in a pole attachment agreement, would that then be a rate term and condition of attachment regulated by the Federal Communications Commission?

MR. WILLIS: Object that you are asking for a legal opinion.

MS. BROWNE: Okay. I'll withdraw that question.

BY MS. BROWNE:

Q Can you refer to your rebuttal testimony at Pages 23 and 24, and it starts at the bottom of Page 23 at Line 25. It says that 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?

A That's correct.

Q Do you know who attended that meeting for the cable operators?

Hearing Exhibit - 000122

A I believe Bryan House Networks (phonetic) was there, Knology, I don't have an exact list, but to my understanding there was roughly 15 individuals from different attaching companies that were present at that meeting.

Q And you were present at the meeting?

A I was not present at that meeting.

Q Can you please explain the basis for your statement that a consensus was reached that the audit was fair, reasonable, cost-effective, and beneficial?

A That's information I received from our management team that was at that meeting.

Q Do you have the names of those individuals?

A Chris Anjuli (phonetic), who was our manager of construction services, and she has responsibility for administration of our joint use contracts.

Q If you will refer to Page 24 of your rebuttal testimony, Lines 22 through 25. The cable companies have had the attitude that they can attach without notice and without doing appropriate loading analysis.

What circumstances or facts support your belief that the companies have such an attitude?

A That is mainly based on the large percentage of unauthorized attachments that we saw back in 2001. We haven't done an audit since then, but that's based on prior experience.

Q When you conducted your audit in 2001, did you take a

Hearing Exhibit - 000123

similar approach that the burden of producing evidence of authorization was on the attaching entity?

A At that time we were going based on attachment count, but we didn't get into, you know, on a pole-by-pole basis who was permitted to be there. Because even if the attaching company did not have a permit, if we had notification we would have included it in our attachment count. So that unauthorized percentage was based on the total number of attachments that we were billing versus the total number of attachments that we found when we performed an audit in the field.

Q Would you agree that it's not always easy for the companies to agree on what constitutes an attachment, a billable attachment?

A It's my understanding that there has been some contention there, yes.

Q Okay. I'm going to move over to the Grade B. Do you agree that the NESC basic standard of construction for poles 60 feet or less is Grade C?

A I'm sorry, can you repeat the question?

Q Do you agree that the NESC basic standard of construction for poles 60 feet or less is Grade C?

A I agree that the National Electric Safety Code from a safety perspective has Grade C as minimum requirements, not for construction, but for safety standards.

Q Can you refer to Pages 15 and 17 of your rebuttal

Hearing Exhibit - 000124

testimony. At both pages you state that poles built to Grade B were the weak link in the system.

A Poles built to Grade B?

Q Sorry, Grade C. Poles built to Grade C were the weak link.

A Which line are you looking at?

Q Lines 9 through 12, it actually states poles not found to meet construction Grade B are considered a weak link on the system.

A That's correct.

Q Page 17, Lines 4 to 5, states the construction Grade C poles are the weak link in Tampa Electric's system.

A Okay. That's correct.

Q Did TECO conduct any studies upon which it bases its conclusion that these poles are the weak link?

A We haven't done any studies. We're just looking at what category of hurricane would those be able to withstand and what wind pressure those would be able to withstand compared to a pole built to Grade B, and the additional risk or chance that that pole would fail compared to a pole built to Grade B standards.

Q But you don't have any forensic data showing that, in fact, these poles have failed more often than Grade B poles?

A No, we do not.

Q Moving on to some questions about Pole Foreman. I

think earlier in your testimony today you stated that the company began using Pole Foreman earlier this year?

A That's correct.

Q At Page 25 of your rebuttal testimony, Lines 13 through 14, you state that Pole Foreman specifically considers the guying effects of lateral lines on the poles.

A That's correct.

Q What assurance do you have that Pole Foreman takes into account the additional guying effects of lateral lines on the poles?

A The way it has been explained to me, the way we have implemented it here at Tampa Electric and with working with the owner of Power Line Technologies when it was implemented here at Tampa Electric that it takes into account all attachments and all the forces, positive or negative, that it places on that pole.

Q Have you read the rebuttal testimony filed by Florida Power and Light or Mr. John McEvoy?

A No, I have not.

Q Do you agree that lateral lines can have a guying effect on the poles?

A It can have a guying effect?

Q Yes.

A They have a loading effect on the pole.

Q Can they also strengthen the pole?

A They can have a positive, right, loading on the pole.

Q I'm going to move to some questions about overlashing. Page 36 of your rebuttal testimony, Lines 5 to 6, you state that overlashing is a fundamental practice which over time has placed a tremendous burden on Tampa Electric's poles. What do you mean by fundamental practice?

A That is, you know, it's a common business practice that we are seeing today that maybe we didn't see ten years ago, and so it's more prevalent today.

Q Can you refer to Tampa Electric's answers to FCTA's Interrogatories, Item Number 20?

A Okay.

Q There you state the company has allowed cable operators to provide notice after the fact for overlashing in the past under the premises that the last admitted and known attacher to the poles in question is accepting responsibility for any violation found during the inspection process.

A Right.

Q In your rebuttal testimony you then state at Pages 36 and 37, and I will quote those in order. At 36 you say the mind-set expressed in Mr. Harrelson's testimony exposes the fundamental case of the abuses found on our system leading to overload. You say the lack of overlash identification by third-party attachers has historically menaced Tampa Electric's.

Hearing Exhibit - 000127

If, in fact, the company was allowing overlashing with after-the-fact notice, how, in fact, is this evidence that the cable operators had a mind-set of abuse?

A I'm reading specifically here. It was allowed in the past, I think, without a full understanding of to what extent that it was going to occur, and now that we have seen how often it's occurring and the potential impact that that overlashing -- and we're not just talking about one coax cable, we're talking multiple overlashes in different bundles, and what the loading impact that those overlashes can have on a pole.

Q Okay. And I want to talk a little bit more later about the specific size of the overlash project, but you would agree that if, in fact, a practice is permitted that it's difficult to say that somebody has actually done something wrong?

A Well, and at the same time it has been permitted, it has been allowed, the requirement was there, but it wasn't enforced and it has been allowed, but the obligation to ensure that that pole still meets the company's standards and stays within compliance was with the attaching entity.

Q Do you have a list of the overlashing abuses that you are referring to in your rebuttal testimony?

A Which list are you referring to?

Q Well, I'm wondering if you have a list or if you have

kept a record of any --

A Well, we submitted some pictures, photographs that show, you know, exactly what we are talking about, but not minimize the characterization of an overlash, and that's included in my Exhibit Number 2, Document 3.

Q Let's go to Exhibit Number 2, Document 3. Can you describe that exhibit?

A These are various photographs showing different attachments. Some are cable TV, some are telecommunications, most of them are showing overlash situations.

Q I notice in a lot of the pictures, though, there are a tremendous number of attachments on every pole. How is it that you determine that the overlash of cable at the middle of the pole caused the pole to overload, to become overloaded?

A Well, this document is not intending to say who's overloading the pole or what is causing an overload. It was more intended to show, you know, pictorially what an overlash is. And, you know, referring to Mr. Harrelson's testimony that -- I can't remember the exact wording, but basically saying that very seldom does an overlash contribute any loading to a pole. And so as you can see these overlash -- I mean, it is up to six cables. If they are a half inch each, that is, you know, three inches of cable, and then you include the messenger, that can add significant additional loading, what we would consider significant additional loading to that pole.

Q I want to get back to that in just a second. My first question, though, is you are familiar with Interrogatory Number 21 that was asked by Florida Cable Telecommunications Association; it said, "Please identify and describe any and all actual examples of a company pole failure that was caused by third-party overlashing?"

A Yes.

Q Do you agree that you did not produce any such exhibits, then?

A Well, we don't have any -- like we said in our response, we didn't have forensic analysis in place during the 2004 storms when we had pole failures. In day-to-day operations if a pole fails, our crews are not doing root cause analysis on what caused the failure, they are just worried about getting customers back in service as quickly as possible.

And moving forward we have a lot more things in place to analyze what caused a failure, so this question specifically asked for failures that have occurred, not overloaded situations, or, you know, situations like these pictures depict.

Q But you have already stated that these pictures don't necessarily support a statement that the overlashing caused the pole to become overloaded, is that correct?

A That's correct. We haven't gone out and actually done the overloading. These pictures were more intended to

Hearing Exhibit - 000130

show exactly what an overlash is.

Q Are you familiar with the practice of Florida Power and Light which is that to the extent that overlashing is done that does not increase the existing bundle size or weight of the bundle on the existing attachment does not require a notice?

A I have heard that. I'm not real familiar with their process.

Q Is that something TECO would be amenable to?

A I'm trying to picture the situation where an overlash would not add any additional loading to the pole.

Q Well, for example, if you were to delash an existing cable and relash, would you agree that that doesn't require any notice or approval?

A The way our current contracts read that is a requirement. Any time you add an attachment.

Q My understanding is that your primary concern is that there are overlashed projects that are extremely large that increase the size of the bundle by a very large amount. Is that correct?

A That is a concern, yes.

Q Is that one of your main concerns?

A You know, I guess our main concern is ensuring that everything that's on the pole is engineered to be there and that pole has capacity to accommodate whatever is being added

Hearing Exhibit - 000131

to the pole. So, you know, if a pole is 99 percent loaded and it is within compliance, as soon as you add even a single coax it could introduce an overloaded situation.

Q Are you familiar, though, with any circumstance in which that has occurred?

A I do not have any specific examples, no. That's a hypothetical.

Q Would the company be amenable to allowing the cable operators to perform the loading analysis themselves?

A At this point, Tampa Electric would like to do the loading analysis, because if the cable TV companies do the analysis we are going to go back after the fact and do it as well to ensure that that pole does meet the company's standards. So, the company's position is that we are going to go ahead and do that loading analysis and try to do it in as timely fashion as we can and meet the schedule that the cable companies are requesting.

Q Would you agree, though, that the cable operators have an equal incentive to ensure that the pole stays up and does not fail?

A Based on past practice, I don't necessarily -- would 100 percent agree with that.

Q You would agree that if the pole fails that their service goes out, as well?

A I agree with that.

Q Would Tampa Electric be amenable to something similar to what the state of New York adopted, which was to allow a predetermined limited amount of overlashing that is not a substantial increase to existing facilities without notification?

A That's setting out some guidelines, what you're saying, for allowing a certain size or a certain number?

Q Right.

A The only thing with that is unless you know what that pole is currently loaded to, you do not know what the impact of adding a certain attachment is going to have on that pole. So, you know, by us adding Pole Foreman we have gotten away from rules of thumb or guidelines, and are emphasizing more let us specifically know what capacity a pole has remaining and what is the most cost-effective way to handle any new attachments that are going to go on that pole, whether it is a third-party attachment or a Tampa Electric attachment.

Q Would you agree, though, that Pole Foreman is a software that the cable operators could use, as well?

A They could obtain a copy and use Pole Foreman.

Q Okay. Let me switch over to the last section here, and I will go through this quickly. I know we are all trying to get home, or continue working, whatever the case may be.

Attachment standards and procedures.

A Okay.

Hearing Exhibit - 000133

Q This is your initial testimony, RBH-1, storm hardening plan. Your rebuttal testimony at Pages 31 to 40 also addresses the attachment standards and procedures. You identify about six sections for which you are requesting specific approval by the Florida Public Service Commission. Section 8.1 is the requirement that parties have an executed agreement.

A That's correct.

Q Would you agree that TECO has an independent right to require parties to have an agreement prior to attaching to their poles?

A That's probably a legal issue. But to my understanding, before anybody attaches to our poles we require that they have an agreement.

Q I guess I'm trying to understand why it's necessary in order to achieve the objective of storm hardening to have this specific requirement approved as part of the plan.

A I think it just gives added emphasis to the -- because we do have certain parties that are attached to our poles right now that we do not have agreements with.

Q Can you state who those parties are?

A I believe one of them to be Time Warner Telecom.

Q Are any cable television operators attached to your poles without an agreement in place?

A No, not to my knowledge.

Hearing Exhibit - 000134

Q Section 8.2 is the permit application procedure. You state that it is a document that is necessary to be exchanged between the parties. Is this something that you believe that the Florida Public Service Commission should be considering and approving in the storm hardening docket?

A I believe that this is directly tied to the storm hardening initiative in that it's the process that needs to be in place to ensure that everything that is attached to the pole has been engineered to be there, that it is going to be through this permit application procedure.

Q Do your existing pole attachment agreements address permit application procedure?

A Yes, they do.

Q Section 8.2.2, which you have added in your rebuttal testimony, which was, I guess, inadvertently omitted from the original list in your initial testimony, concerns the engineering study of proposed pole attachments and Tampa Electric construction standards.

A Right.

Q Are you familiar with the FCC's requirement concerning preconstruction engineering analyses?

A No, I'm not.

Q This Section 8.2.2 states that Tampa Electric will determine access for joint use parties in ten days, but for cable operators in 45 days. Can you explain the basis for this

Hearing Exhibit - 000135

time difference?

A No, I cannot. I would have to look into that. I can provide a better answer, but I'm not completely sure right now of the reasons for that difference.

Q Okay. I would like to hear it. I would like to get the ten days. Section 8.4.1, procedure for notification of noncompliance. Again, is this something that is covered by your existing pole attachment agreements?

A Which sentence again, I'm sorry?

Q Section 8.4.1, procedures for notification of noncompliance.

A Yes, I believe that is in our current agreements.

Q And Section 8.8 pertaining to unauthorized attachments. Is this something that is currently covered by your pole attachment agreements?

A I believe what I said earlier is that I'm not sure if this detail, all of this detail is included in all of our agreements, but that this is consistent with past practice and how we have implemented and worked with our attachers on these issues.

Q And Section 8.5 pertaining to the use of NJUNS. Is that covered by your existing pole attachment agreements?

A I do not know the answer to that.

Q Can you please explain why the Florida Public Service Commission should approve the use of NJUNS in the context of

Hearing Exhibit - 000136

storm hardening?

A It think it was more included for completeness and to know what tool or process that we are using for communication, and this is notification, and then as well communication that Tampa Electric is providing joint users in terms of projects and transfer requests, that kind of thing.

Q So are you asking for approval of this specific type of communication?

A No, I don't think that this is something that requires approval. It is more information.

MS. BROWNE: That's it. That concludes my questions.

THE WITNESS: Okay. Thank you.

MR. WILLIS: I do not have questions, but we would like to read and sign.

MS. FLEMING: Does anybody else have anything more?

MR. O'ROARK: No further questions from me.

(The deposition concluded at 5:22 p.m.)

Hearing Exhibit - 000137

Hearing Exhibit - 000138

ERRATA SHEET

DO NOT WRITE ON TRANSCRIPT - ENTER CHANGES HERE

IN RE: DOCKET NO. 070297-EI, et al.
NAME: REGAN B. HAINES
DATE: September 18, 2007

PAGE	LINE	CHANGE
45	1	change Bryan to Bright
45	13	change Chris Anjuli to Kris Angiulli

Under penalties of perjury, I declare that I have read my deposition and that it is true and correct subject to any changes in form or substance entered here.

9-27-07
DATE

WITNESS NAME

STATE OF FLORIDA)
: CERTIFICATE OF OATH
COUNTY OF LEON)

I, the undersigned authority, certify that REGAN B. HAINES appeared telephonically before me and was duly sworn.

WITNESS my hand and official seal this 21st day of September, 2007.

JANE FAUROT
Notary Public - State of Florida

JANE FAUROT
MY COMMISSION # DD 407892
EXPIRES: July 16, 2009
Bonded Thru Notary Public Underwriters

CERTIFICATE OF OATH

STATE OF Florida

COUNTY OF Hillsborough

I, the undersigned authority, certify that Regan B. Haines personally appeared before me at 702 N. Franklin St and was duly sworn by me to tell the truth.

WITNESS my hand and official seal in the City of Tampa, County of Hillsborough, State of Florida, this 18th day of September, 2009.

Notary Public State of Florida
Cynthia Roy Kyle
My Commission DD645902
Expires 03/01/2011

Cynthia Roy Kyle

Notary Public

State of Florida

Personally known ✓ OR produced identification _____.

Type of identification produced _____.

STATE OF FLORIDA)
: CERTIFICATE OF REPORTER
COUNTY OF LEON)

I, JANE FAUROT, Official FPSC Commission Reporter, do hereby certify that I was authorized to and did stenographically report the foregoing deposition at the time and place herein stated.

I FURTHER CERTIFY that this transcript, consisting of 59 pages, constitutes a true record of the testimony given by the witness.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 21st day of September, 2007.

JANE FAUROT, RPR
Chief, Hearing Reporter Services
Office of Commission Clerk
(850) 413-6732

Hearing Exhibit - 000141

TAMPA ELECTRIC COMPANY
DOCKET NO. 070297-EI
LATE FILED DEPOSITION EXHIBIT
EXHIBIT NO. 1
PAGE 1 OF 1
FILED: SEPTEMBER 28, 2007

1. The table below is in response to the Late Filed Exhibit requested in the deposition of Regan Haines held on September 18, 2007.

Rate Impact per 1,000 kWh Approved Hardening Initiatives and Proposed Hardening	
2007	$0.85
2008	$1.19
2009	$1.44

(This page intentional left blank)

EXHIBIT NO. _____

DOCKET NO: 070298-EI- PROGRESS ENERGY FLORIDA, INC.

WITNESS: VARIOUS

DESCRIPTION: STAFF'S COMPOSITE EXHIBITS - 3

DOCUMENTS:

1) Progress' Response to Staff's First Set of Interrogatories (Nos. 1-68)
2) Progress' Response to Staff's Second Set of Interrogatories (Nos. 69-75)
3) Deposition Transcript of Jason Cutliffe (including errata sheet)
4) Late-Filed Deposition Exhibit No. 1 to the Deposition of Jason Cutliffe

PROFFERED BY: STAFF

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070298-EI **EXHIBIT** 3
COMPANY FL PSC Staff
WITNESS Staff's Composite Exhibit-3 Stipulated
DATE 10/2+3/07

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	Docket No. 070298-EI Submitted for Filing: August 13, 2007

PROGRESS ENERGY FLORIDA'S RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1-68)

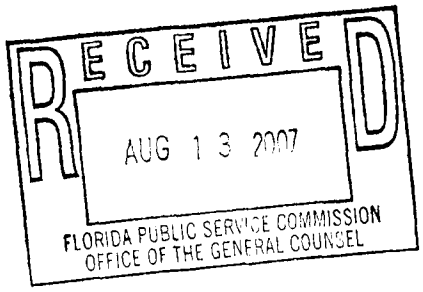
Progress Energy Florida, Inc. ("PEF"), responds to Staff's First Set of Interrogatories to PEF (Nos. 1-68), as follows:

INTERROGATORIES

Compliance with National Electrical Safety Code

1. In its Plan, PEF asserts that its construction standards meet or exceed the National Electrical Safety Code (NESC). How does PEF verify that, at a minimum, it has complied with the 2007 NESC?

Answer: PEF calculates recommended pole size and class based on different construction configuration standards for the loading areas within their service territory, in compliance with the structural requirements of the 2007 NESC. The loading areas are as defined and illustrated in the 2007 NESC. PEF then creates tables that are published in our Construction Specifications Manual for use by our design and construction personnel. The construction parameters include wire size, span length, equipment, framing configuration, joint use attachments, etc. Field personnel designing lines within these parameters meet or exceed the structural requirements of the 2007 NESC. Construction audits are performed to verify that design and construction has complied with the standards.



Extreme Wind Loading Standards (EWL)

Subject matter: Incremental Changes to Extreme Wind Loading Construction Standards - EWL standards

2. For each of the following, please provide a list of each proposed change to PEF's current construction standards, policies, practices and procedures contained in its Storm Hardening Plan.

A. New distribution facilities;

B. Major planned expansion, rebuild, or relocation of distribution facilities;

C. Critical infrastructure and major thoroughfares.

Answer: With respect to the application of the EWL standard to distribution poles, none for A, B, and C above.

3. For each of the following, please state the scope of each proposed change, the cost of each change, the corresponding effect of reduced storm restoration costs and outage times, and how cost effectiveness is determined:

A. New distribution facilities;

B. Major planned expansion, rebuild, or relocation of distribution facilities;

C. Critical infrastructure and major thoroughfares.

Answer: With respect to the application of the EWL standard to distribution poles, none for A, B, and C above.

4. For each of the following, please list the specific efforts that are being made by PEF to gather and assess information to ensure that it has implemented the most cost-effective EWL standard considering storm restoration costs and storm caused outages:

A. New distribution facilities;

B. Major planned expansion, rebuild, or relocation of distribution facilities;

C. Critical infrastructure and major thoroughfares.

Answer: Not applicable. PEF has not implemented the EWL standard for distribution poles. Nonetheless, PEF has implemented pilot projects to evaluate the EWL standard as applied to distribution poles as discussed in detail in PEF's Storm Plan and its Plan Supplement filed on August 8, 2007.

Subject Matter: Pilot EWL Project

5. Attachment I to PEF's Plan includes a letter from Akerman Senterfitt P.A., dated May 3, 2007, that references a pilot extreme wind loading project. Please identify and describe PEF's activities and costs regarding the referenced pilot extreme wind loading project.

Answer: PEF did not prepare the letter in Attachment I, so PEF cannot say for sure what that letter is referring to. PEF assumes that the pilot project in question is the same one identified in PEF's Storm Hardening Plan. Pursuant to Rule 1.340(c), Fla. R. Civ. P., PEF refers Staff to PEF's Storm Hardening Plan and its Plan Supplement, specifically pages 5, 7, 11, 14-16 of PEF's Plan and Attachments A-E of PEF's Plan Supplement.

Subject Matter: Scope of Storm Hardening/AIS Planning Tool

6. How does PEF differentiate with respect to construction standard practices and costs between storm hardening and its daily operations?

Answer: As discussed in PEF's Storm Hardening Plan and its Plan Supplement, storm hardening is and should be a part of every utilities' daily operations as it is a 365 day-a-year process. As to specific storm hardening initiatives that PEF has underway, (such as conversions from wood to steel and concrete poles, targeted submersible underground applications, etc.), PEF has separately delineated and detailed those projects in its Storm Hardening Plan and the Supplement thereto.

7. Please describe the process or methodology used by PEF to measure the percentage of storm hardening on a project-by-project basis, as referenced on page 12 of PEF's Plan.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Page 6 of the Asset Investment Strategy (AIS) Model Summary Report filed on August 8, 2007 as Attachment E to PEF's Plan Supplement.

8. Please explain how NESC construction Grade C addresses the intent of Rule 25-6.0342(b), Florida Administrative Code, for the regions within PEF's service area (NESC Figure 250-2(d)?

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., PEF refers Staff to PEF's Storm Hardening Plan and its Plan Supplement, specifically pages 5, 7, 11, 14-16 of PEF's Storm Hardening Plan and the attachments referenced on those pages; pages 1-4, 6-7 of PEF's Plan Supplement; and Attachments A-C of PEF's Plan Supplement.

9. What is the basis for PEF's decision to use a three-year CEMI4 index for evaluation of storm hardening projects (Page 13 of the Plan)?

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Page 9 of the Asset Investment Strategy (AIS) Model Summary Report filed on August 8, 2007 as Attachment E to PEF's Plan Supplement.

10. According to PEF's Plan, the 2006 costs for PEF's distribution hardening project totaled $10,200,000. Please provide a detailed description of each project that is included in the $10,200,000 cost.

Answer:

Program	2006
Small Diameter Conductor Upgrade	$1,100,000
Midfeeder Electronic Sectionalizing	$600,000
Wood Pole Replacements	$3,500,000
Padmount Transformer Inspections	$600,000
Padmount Transformer Replacements	$4,400,000
	$10,200,000

11. What percentage of PEF's total distribution system on a mile basis is considered critical infrastructure?

Answer: Critical infrastructure is defined as infrastructure that is vital to the community's welfare. Examples include 911 Call Centers, Emergency Operations Centers (EOC), fire and police services, hospitals, emergency shelters, sewage pumping stations, schools, and gas stations.

Virtually all of the distribution assets on PEF's system serve critical infrastructure facilities. Recognizing this fact, PEF's restoration priorities are very specific and event driven. The priority is determined through collaboration with County EOC's and is unique to the damage resulting from each event. PEF resources are committed to each County EOC during the event to ensure the county's needs are met.

12. What percentage of PEF's total distribution system on a plant-in-service basis is considered critical infrastructure?

Answer: Critical infrastructure is defined as infrastructure that is vital to the community's welfare. Examples include 911 Call Centers, Emergency Operations Centers (EOC), fire and police services, hospitals, emergency shelters, sewage pumping stations, schools, and gas stations.

Virtually all of the distribution assets on PEF's system serve critical infrastructure facilities. Recognizing this fact, PEF's restoration priorities are very specific and event driven. The priority is determined through collaboration with County EOC's and is unique to the damage resulting from each event. PEF resources are committed to each County EOC during the event to ensure the county's needs are met.

13. What percentage of PEF's total critical infrastructure on a mile basis requires storm hardening?

Answer: Critical infrastructure is defined as infrastructure that is vital to the community's welfare. Examples include 911 Call Centers, Emergency Operations Centers (EOC), fire and police services, hospitals, emergency shelters, sewage pumping stations, schools, and gas stations.

Virtually all of the assets on PEF's system serve critical infrastructure facilities. Recognizing this fact, PEF has employed a "total system approach" to storm hardening as described in detail in PEF's Storm Plan and Plan Supplement. Simply stated, all of PEF's facilities require storm hardening through proper construction, maintenance, vegetation management, inspection, and targeted applications of specific "hardening" projects.

14. What percentage of PEF's total critical infrastructure on a plant-in-service basis requires storm hardening?

Answer: Critical infrastructure is defined as infrastructure that is vital to the community's welfare. Examples include 911 Call Centers, Emergency Operations Centers (EOC), fire and police services, hospitals, emergency shelters, sewage pumping stations, schools, and gas stations.

Virtually all of the assets on PEF's system serve critical infrastructure facilities. Recognizing this fact, PEF has employed a "total system approach" to storm hardening as described in detail in PEF's Storm Plan and Plan Supplement. Simply stated, all of PEF's facilities require storm hardening through proper construction, maintenance, vegetation management, inspection, and targeted applications of specific "hardening" projects.

15. What percentage of PEF's total critical infrastructure on a mile basis will be hardened each year during the 2007-2009 timeframe?

Answer: Critical infrastructure is defined as infrastructure that is vital to the community's welfare. Examples include 911 Call Centers, Emergency Operations Centers (EOC), fire and police services, hospitals, emergency shelters, sewage pumping stations, schools, and gas stations.

Virtually all of the assets on PEF's system serve critical infrastructure facilities. Recognizing this fact, PEF has employed a "total system approach" to storm hardening as described in detail in PEF's Storm Plan and Plan Supplement. Simply stated, all of PEF's facilities require storm hardening through proper construction, maintenance, vegetation management, inspection, and targeted applications of specific "hardening" projects. Pursuant to Rule 1.340(c), Fla, R. Civ. P., please see PEF's Storm Hardening Plan at pages 4-21 and Attachment B; and PEF's Plan Supplement-Attachments B and D for specific information relating to 2007-2009.

16. What percentage of PEF's total critical infrastructure on a plant-in-service basis will be hardened each year during the 2007-2009 timeframe?

Answer: Critical infrastructure is defined as infrastructure that is vital to the community's welfare. Examples include 911 Call Centers, Emergency Operations Centers (EOC), fire and police services, hospitals, emergency shelters, sewage pumping stations, schools, and gas stations.

Virtually all of the assets on PEF's system serve critical infrastructure facilities. Recognizing this fact, PEF has employed a "total system approach" to storm hardening as described in detail in PEF's Storm Plan and Plan Supplement. Simply stated, all of PEF's facilities require storm hardening through proper construction, maintenance, vegetation management, inspection, and targeted applications of specific "hardening" projects. Pursuant to Rule 1.340(c), Fla, R. Civ. P., please see PEF's Storm Hardening Plan at pages 4-21 and Attachment B; and PEF's Plan Supplement-Attachments B and D for specific information relating to 2007-2009.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards

17. Please provide a list of changes to PEF's current construction standards, policies, practices and procedures proposed by PEF's Storm Hardening Plan.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see pages 7-8 of PEF's Storm Hardening Plan.

18. For each change identified in response to Interrogatory No. 17, please state the scope of each change, the cost of each change, and the corresponding effect of reducing storm restoration costs and outage times, and how cost effectiveness is determined.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see pages 7-14 of PEF's Storm Hardening Plan; pages 4-5 of PEF's Plan Supplement; and Attachments B and E to PEF's Plan Supplement.

Subject Matter: AIS Model

19. Please explain in detail how PEF evaluates Major Storm Impact, Community Storm Impact, and Overall Reliability, including all specific factors, weights, parameters, etc., contained in the Asset Investment Strategy (AIS) model used to make such evaluations.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Page 6-9 of the Asset Investment Strategy (AIS) Model Summary Report filed on August 8, 2007 as Attachment E to PEF's Plan Supplement.

Subject Matter: Areas Prone to Flooding and Storm Surge

20. During the 2004 and 2005 hurricane seasons, what percent of PEF's underground facilities located in Category 1-3 storm surge areas experienced flooding or storm surge damage?

Answer: PEF will provide the answer to this question in a supplemental response as soon as it is available.

21. Please provide a detailed list of the underground facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damage during the 2004 and 2005 hurricane seasons.

Answer: PEF will provide the answer to this question in a supplemental response as soon as it is available.

22. During the 2004 and 2005 hurricane seasons, what percent of PEF's overhead facilities located in Category 1-3 storm surge areas experienced extreme wind or wind debris damage?

Answer: PEF will provide the answer to this question in a supplemental response as soon as it is available.

23. Please provide a detailed list of the overhead facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damages during the 2004 and 2005 hurricane seasons.

Answer: During the 2004 and 2005 hurricane season, flooding and storm surge was not the cause of damage to PEF's overhead system in the Category 1-3 storm surge areas.

24. Has PEF concluded that underground distribution facilities are less susceptible to storm damage than overhead distribution facilities for coastal areas of its service territory?

Answer: PEF is studying this issue both independently and with others (such as other Florida utilities, PURC, etc.) and PEF has not reached definitive conclusions to date.

A. If so, what is the basis for that conclusion?

Answer: Not applicable.

25. Please identify all storm hardening projects located in areas PEF believes are prone to storm surge and flooding.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see the Asset Investment Strategy (AIS) Model Summary Report filed on August 8, 2007 as Attachment E to PEF's Plan Supplement.

A brief listing is as follows: Coquina Key, Floramar Subdivision, Feeder X220, St. George Island Plantation, and Homosassa – Riverhaven.

26. On page 7 of the Plan, PEF asserts it has identified areas where current underground equipment should be replaced with overhead equipment because the areas are subject to frequent and prolonged flooding. Please identify each area where PEF has determined that underground equipment should be replaced with overhead equipment for the reason stated above.

Answer: The Saddle Bag Lakes subdivision located in Polk County, east of Lake Wales, is the primary area that experience prolonged flooding and water intrusion due to the 2004 and 2005 hurricanes. Beginning with the 2004 hurricane season, approximately 75% of this subdivision became flooded causing PEF to have to de-energize its underground equipment there. Due to excessive rainfall and high lake levels, flood waters stayed on the ground for about 9 months, thereby preventing PEF from restoring service to underground facilities there. Because this area is susceptible to prolonged flooding, overhead equipment in this area would prevent equipment such as wires and transformers from being submerged under water and would allow PEF to immediately restore service to residences in this area once they were fit to be occupied again.

27. What are the costs or estimated costs for each site in which PEF has determined that underground equipment should be replaced with overhead equipment?

Answer: Without considering the cost of the equipment lost during exposure to prolonged flood waters, the approximate cost to convert remaining underground facilities is approximately $350,000.

28. What is the estimated reduction in storm restoration costs for each site in which PEF has determined that underground equipment should be replaced with overhead equipment?

Answer: The estimated cost to replace the damaged underground equipment in Saddle Bag Lakes is $740,000.

29. What is the estimated reduction in customer outages for each site in which PEF has determined that underground equipment should be replaced with overhead equipment?

Answer: The Saddle Bag Lakes customers were without power for approximately 9 months due to the prolonged flooding. That is about 6,480 hours that the customers had an outage.

30. Please list the costs or estimated costs to third-party attachers for each site in which PEF has determined that underground equipment should be replaced with overhead equipment.

Answer: As a primary issue, third-party attachers will need to determine if they will attach to any new overhead facilities PEF installs. Third-party attachers may determine not to move their facilities even if PEF decides to convert underground facilities to overhead. If third-party attachers do attach to PEF's new overhead facilities, costs to those attachers would be determined by appropriate means.

31. Please list the benefits to third-party attachers for each site in which PEF has determined that underground equipment should be replaced with overhead equipment.

Answer: If third-party attachers moved their facilities from underground to overhead in these areas, they would enjoy the same benefits that PEF would enjoy—namely, not having their assets exposed to prolonged flood waters and the ability to quickly restore service to their customers on a comparative basis.

32. Please identify all critical infrastructure sites located in areas PEF believes are prone to storm surge and flooding.

Answer: Critical infrastructure is defined as infrastructure that is vital to the community's welfare. Examples include 911 Call Centers, Emergency Operations Centers (EOC), fire and police services, hospitals, emergency shelters, sewage pumping stations, schools, and gas stations.

Virtually all of the assets on PEF's system serve critical infrastructure facilities. Recognizing this fact, virtually all of PEF's costal areas and inland areas that are subject to both short and long term flood exposure are implicated.

33. How has PEF mitigated flood and storm surge damage to underground distribution facilities when developers, communities, governmental agencies, or homeowners request underground distribution facilities in the Company's flood and storm surge prone areas?

Answer: As reflected in PEF's Storm Hardening Plan at pages 7-8, PEF works with such entities/individuals to make sure they understand the implications of using underground facilities in such areas and to make sure that they understand that in some situations, underground facilities may not be the best choice if they have the potential to be destroyed and/or put out of service for prolonged periods of time due to flooding. For other efforts in this regard, please see pages 7-14 of PEF's Storm Hardening Plan; pages 4-5 of PEF's Plan Supplement; and Attachments B and E to PEF's Plan Supplement.

Placement of New and Replacement Distribution Facilities to Facilitate Safe and Efficient Access

Subject Matter: Incremental Changes to Standards for Placement of New and Replacement Distribution Facilities

34. Please provide a list of changes to PEF's current construction standards, policies, practices and procedures contained in its Storm Hardening Plan.

Answer: As stated at pages 8-9 of PEF's Storm Hardening Plan, PEF will continue to use front lot construction for all new distribution facilities and all replacement distribution facilities unless a specific operational, safety, or other site-specific reason exists for not using such construction at a given location.

35. For each change identified in response to Interrogatory No. 34, please state the scope of each change, the cost of each change, and the corresponding effect of reducing storm restoration costs and outage times and how cost-effectiveness is determined.

Answer: Please see PEF's response to Interrogatory 34 above and Attachment B to PEF's Plan Supplement.

36. Please describe PEF's current policy regarding placement of new and replacement facilities, and identify where that policy is described in PEF's Storm Hardening Plan.

Answer: Pages 8-9 of PEF's Storm Hardening Plan: "PEF will continue to use front lot construction for all new distribution facilities and all replacement distribution facilities unless a specific operational, safety, or other site-specific reason exists for not using such construction at a given location." See Distribution Engineering Manual, Section xv(1).

PEF engineering underground design guide DST-EDGX-00028, page 2 states:

> *"Underground cables should typically be installed in a utility easement immediately adjacent to the road right of way or on road right of way immediately adjacent to the property line".*

PEF's engineering overhead design guide DST-EDGX-00027, page 3 states:

> *"Access to the poles by line trucks reduces the time for restoration and the cost of future maintenance. For new residential lines, front lot line construction shall be used. Lines shall not be located on rear or side lot lines even if the customer wants to pay the additional cost. Lines outside of a residential development should also be located along road access whenever possible. Road access not only allows for truck access but also reduces tree exposure and trimming on one side of the line."*

Subject Matter: Relocation of Storm Damaged Facilities

37. What quantitative criteria are used by PEF to evaluate opportunities to relocate rear lot facilities?

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see the Asset Investment Strategy (AIS) Model Summary Report filed on August 8, 2007 as Attachment E to PEF's Plan Supplement.

38. Please describe the procedure used by PEF to coordinate relocation of storm damaged facilities with third-party attachers and customers.

Answer: Not applicable. PEF rebuilds storm damaged facilities in the same location during the restoration process.

39. What qualitative criteria are used to evaluate opportunities to relocate rear lot facilities?

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see the Asset Investment Strategy (AIS) Model Summary Report filed on August 8, 2007 as Attachment E to PEF's Plan Supplement.

Description of facilities affected

40. Please provide a list of each geographic site where PEF plans to implement storm hardening activities during the years 2007 through 2009.

A. For each site listed in response to Interrogatory No. 40, please state the scope of the storm hardening activity, the estimated investment costs, estimated operational expenses, estimated storm restoration costs savings, estimated reduction in storm caused outages, and the criteria PEF used to select the site for storm hardening.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see PEF's Storm Hardening Plan at pages 2-8, 14-20, and Attachment B; and PEF's Plan Supplement at pages 1-7 and Attachments A-D.

Communities and Areas where Electric Infrastructure Improvements are to be Made

41. Please describe the process that PEF used to determine and schedule which communities would receive electric infrastructure improvements.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Pages 9-14 of PEF's Storm Hardening Plan; Attachment B to PEF's Storm Hardening Plan; and Attachment E to PEF's Plan Supplement.

PEF's Definition of Critical Infrastructure and Major Thoroughfares

42. What is PEF's definition of critical infrastructure facilities?

Answer: Critical infrastructure is defined as infrastructure that is vital to the community's welfare. Examples include 911 Call Centers, Emergency Operations Centers (EOC), fire and police services, hospitals, emergency shelters, sewage pumping stations, schools and gas stations.

43. What is PEF's definition of major thoroughfares?

Answer: Major thoroughfares are defined as major transportation arteries (such as interstate highways, major state highways and significant local roads) that are vital to first responder movement, the delivery of critical resources to communities, and evacuation.

44. Please describe the process used by PEF to coordinate the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, or local communities.

Answer: Determinations of critical infrastructure and major thoroughfares are made through collaboration with County EOCs and through direct contact with local government and major customers. Please see Exhibit B to PEF's Storm Hardening Plan for more information on these issues.

A. Please identify each governmental agency, company, municipality, or local community, if any, that PEF coordinated with to determine the selection of critical infrastructure and major thoroughfares.

Answer: Through the process and procedures described in Exhibit B to PEF's Storm Hardening Plan, PEF has coordinated with virtually all of the County EOCs, local governments, and major customers in its service territory.

B. If the response to Interrogatory 44(A), is "none," please provide an explanation as to why PEF has not coordinated the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, or local communities.

Answer: Not applicable.

Estimate of Costs and Benefits to PEF

45. Please provide PEF's estimated costs and benefits for each of its storm hardening activities for the years 2007 through 2009.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Pages 21-22 of PEF's Storm Hardening Plan; Attachment B to PEF's Storm Hardening Plan; and Attachments A and B to PEF's Plan Supplement.

Subject Matter: AIS Tool

46. Please provide the financial cost assumptions used to estimate the net present value for the projects referenced on pages 11 and 12 of PEF's Storm Hardening Plan.

Answer: Project costs were estimated in 2007 dollars.

47. Please provide the storm hardening costs and storm hardening benefits to PEF for each storm hardening project for the years 2007 through 2009.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Pages 21-22 of PEF's Storm Hardening Plan; Attachment B to PEF's Storm Hardening Plan; and Attachments A and B to PEF's Plan Supplement.

48. Please describe the process and metrics PEF uses to ensure that cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.

Answer: PEF's Distribution Storm Plan has several controls in place.

Safety and Construction Standards

Briefing the contract crew on safety and the construction standards is mentioned in PEF's March 1st Reliability Report, Section 2 – Staging and Logistics, page 35 of 41 by describing the duties of the Site Safety Proctor. The Feeder/Field Coordinator is the local contact for the crew. The duties of the Feeder/Field Coordinator are described in Section 13 – Operations Center, page 12 of 18.

Restoration Priorities

Restoration priorities are set on various levels in the plan. PEF provides a representative to the county EOC's. This person is responsible for working with the EOC to set the restoration priorities for the county. See PEF's March 1st Reliability Report, Section 8, page 18-19 of 25. Section 13 – Operations Center, pages 3-4 of 18 details the responsibility of the Operations Center Coordinator. The Tactical Management Coordinator is responsible for the prioritizing the outage restoration. See pages 6-7 of 18 of section 13. The Feeder/Field Coordinator is responsible for communicating to the crews the restoration priorities. See Section 13 – Operations Center, page 11 or 18.

Resource Management and Damage Assessment play a key role in restoration times and cost controls. See Section 10 – Resource Management, pages 9-10 of 21 for the details of the Crew Acquisition Lead who is responsible for goal achievement and crew demobilization. See Section 6 for the Damage Assessment processes. The processes are Predictive Modeling, Statistical Damage Assessment, Full Damage Assessment, Electrical Sweep, Tree Sweep and Final Sweep.

49. Page 5 of PEF's Plan states that there is no current data or research to support the application of the extreme wind standard to distribution pole construction. Page 12 of PEF's Plan states that the potential benefits during a major storm are determined based on reduced storm damages or the ability to restore power more rapidly. Please list each potential benefit PEF will determine during a major storm based on reduced storm damages or the ability to restore power more rapidly, and explain how each determination will be made.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Pages 1-3, 6-8, and Attachments A and B of PEF's Plan Supplement.

A. If the benefits listed in response to Interrogatory No. 49 do not include reduction of storm restoration costs and customer outages, please explain the basis for excluding consideration of these factors.

Answer: Not applicable.

50. Please refer to PEF's estimated benefits associated with its vegetation program in Docket No. 060198-EI. Please explain why PEF elected to make estimates of benefits associated with its vegetation program in Docket No. 060198-EI, but elected to wait for actual storm event data to determine benefits associated with an increased EWL standard in connection with its Storm Hardening Plan.

Answer: PEF made estimated benefit assumptions regarding potential avoided outages and restoration costs during hurricanes in Docket No. 060198-EI because Staff asked PEF to do so, just as Staff has asked PEF to do again in this docket. As PEF stated in that docket and in its Plan Supplement in this docket, however, "PEF cannot reasonably and accurately predict future storm activity and storm impacts, nor can PEF accurately predict how new hardening programs will perform in those storms. This is the major reason that PEF has taken a methodical, scientific approach to potential hardening options through the use of its AIS system and its work with PURC and other utilities. In its plan, PEF is testing applications in real storms and is gathering real data so PEF can properly evaluate the efficacy of different hardening options prior to implementing system-wide applications that may or may not provide storm hardening benefits." Nonetheless, PEF has provided estimated benefit assumptions in the manner requested by Staff to the best of its ability.

51. Please describe the method or criteria that PEF used to determine that its EWL criteria is appropriate. Please include in your response all estimates of costs and benefits to the PEF.

Answer: Not applicable. PEF has not adopted the EWL standard for its distribution poles. For information and data relating to why PEF has not adopted this standard, please see PEF's Storm Hardening Plan at pages 4-7 and Exhibits D-G; and PEF's Plan Supplement, pages 1-6 and Attachments A-C.

52. Please describe the method or criteria that PEF used to determine that its level of underground facility installations is appropriate. Please include in your response all estimates of costs and benefits to PEF.

Answer: PEF assumes that Staff's question relates to the undergrounding projects that PEF identified in its Storm Hardening Plan. Accordingly, and pursuant to Rule 1.340(c), Fla. R. Civ. P., please see PEF's Storm Hardening Plan at pages 9-14, and PEF's Plan Supplement, Attachment E.

53. Please provide the estimated costs and benefits to PEF that are associated with implementing an EWL standard consistent with NESC Figure 250(d).

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see PEF's Plan Supplement, Attachments A-C. PEF has identified costs and negative benefits associated with implementing an EWL standard in the manner described.

Estimate of Costs and Benefits to Third-Party Attachers

54. Please identify all specific assumptions third-party attachers should use in estimating cost impacts from PEF's Plan for each year from 2007 through 2009.

Answer: Unknown to PEF. All information regarding PEF's plan has been set forth in detail in PEF's Storm Hardening Plan and its Plan Supplement. PEF is unaware of what assumptions or conclusions that third-party attachers will draw from that information. However, PEF is working and has worked closely with all third-party attachers that have intervened in PEF's Storm Hardening Plan Docket to resolve any questions or issue that they have.

55. Please identify all specific assumptions third-party attachers should use in estimating benefits accruing from the implementation of PEF's Plan for each year from 2007 through 2009.

Answer: Unknown to PEF. All information regarding PEF's plan has been set forth in detail in PEF's Storm Hardening Plan and its Plan Supplement. PEF is unaware of what assumptions or conclusions that third-party attachers will draw from that information. However, PEF is working and has worked closely with all third-party attachers that have intervened in PEF's Storm Hardening Plan Docket to resolve any questions or issue that they have.

56. Please provide the total number of joint use poles that PEF's Plan will impact for each year from 2007 through 2009.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Attachment D to PEF's Plan Supplement.

57. Please state the estimated number or percentage of joint use poles that will be impacted by PEF's Plan for each third-party attacher for each year from 2007 through 2009.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Attachment D to PEF's Plan Supplement.

58. Please identify the incremental hardening costs for each year from 2007 through 2009, which will be attributable to third-party attachers.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Attachment D to PEF's Plan Supplement.

59. Please identify the proportion of incremental hardening costs attributed to third-party attachers that are perceived to be PSC mandated.

Answer: None that PEF is aware of.

60. For each circumstance where costs are attributed to third-party attachers, please describe the methodology that will be used by PEF to assign cost among the third-party attachers.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Attachment D to PEF's Plan Supplement.

61. Please describe the process that PEF will use to notify third-party attachers of the schedule when a pole is being storm-hardened.

Answer: PEF is currently negotiating this issue with the other Florida IOUs and the joint attachers that are participating in these proceedings in an effort to stipulate to a common process that all of the IOUs and joint attachers can consistently use. PEF believes that Staff is aware of the current state of these negotiations through information provided in the informal workshop process that has been proceeding in this docket.

62. Please describe the process that PEF will use to determine each third-party attachers' share of the costs when a pole is being storm-hardened.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Attachment D to PEF's Plan Supplement.

Estimate of the Effect on Reducing Storm Restoration Costs and Customer Outages - Electric Utility

63. Please provide PEF's estimated reduction in storm restoration costs and customer outages for each of its storm hardening activities for the years 2007 through 2009.

Answer: Pursuant to Rule 1.340(c), Fla. R. Civ. P., please see Attachments A and B to PEF's Plan Supplement.

64. Please describe the process and metrics used by PEF to ensure that total program cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.

Answer: This question is redundant of Interrogatory 48 above. Please see PEF's response to Interrogatory 48.

Subject matter: AIS Tool

65. Please provide the change in storm restoration costs and customer outages for each storm hardening project for the years 2007 through 2009.

Answer: This question is redundant of Interrogatory 63 above. Please see PEF's response to Interrogatory 63.

66. Please describe the process and metrics used by PEF to ensure that cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.

Answer: This question is redundant of Interrogatories 48 and 64 above. Please see PEF's response to Interrogatories 48 and 64.

67. Please provide the estimated costs, reduction in storm restoration costs, and customer outages associated with implementing an EWL standard consistent with NESC Figure 250(d).

Answer: This question is redundant of Interrogatory 53 above. Please see PEF's response to Interrogatory 53.

68. Please explain how PEF proposes to determine when a more substantive increase in promotion of underground facilities is supported due to the reduction of storm restoration costs and reduced customer outages.

Answer: When PEF obtains credible information through its individual efforts, its efforts with other utilities, its efforts with PURC and the research community, through interaction with the FPSC and its ongoing efforts, and/or through any other credible source which shows that underground facilities are more appropriate in a given area of PEF's service territory as compared to overhead facilities based on all relevant factors, including, but not limited to, the reduction of storm restoration costs and customer outages, then PEF will take appropriate measures with regard to promoting and/or implementing underground facilities in any such areas.

AFFIDAVIT

STATE OF FLORIDA)
)
COUNTY OF SEMINOLE)

Before me, the undersigned authority, personally appeared CHARLENE RUBANO, who

(✓) is personally known to me, or

( ) produced _____ as identification and who, being duly sworn, deposes and says that the foregoing answers to Interrogatory Nos. 1 through 68 of Staff's First Set of Interrogatories to Progress Energy Florida, Inc., in Docket No. 070298-EI are true and correct to the best of his knowledge, information and belief.

Charlene Rubano

Lead Engineer
Title

Notary Public
State of Florida

My commission Expires: July 20, 2011

KAIYA K. HALL
MY COMMISSION EXPIRES
July 20, 2011
#DD 653065
Bonded thru
Notary Public Underwriters
NOTARY PUBLIC, STATE OF FLORIDA

GCL

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	Docket No. 070298-EI Submitted for Filing: August 13, 2007

PROGRESS ENERGY FLORIDA, INC's
NOTICE OF SERVICE

Progress Energy Florida, Inc. hereby gives notice of service of Progress Energy Florida's responses to Staff's First Set of Interrogatories (Nos. 1-68) via email and hand delivery to Lorena Holley, as counsel for Office of the General Counsel, Florida Public Service Commission.

John T. Burnett LMS

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DOCUMENT NUMBER-DATE
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FPSC-COMMISSION CLERK

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished via U.S. Mail this 13th day of August, 2007 to all parties of record as indicated below.

John T. Burnett LMS
JOHN T. BURNETT

Lorena Holley, Esq. Keino Young, Esq. Office of General Counsel Florida Public Service Commission 2540 Shumard Oak Blvd. Tallahassee, FL 32399-0850 AT&T Florida Ms. Jennifer Kay c/o Nancy Sims 150 S. Monroe Street, Suite 400 Tallahassee, FL 32301 Maria T. Browne Davis Law Firm 1919 Pennsylvania Ave., NW, Suite 200 Washington, DC 20006 Ms. Beth Keating, Esq. Akerman Senterfitt 106 E. College Avenue, Suite 1200 Tallahassee, FL 32301	Florida Cable Telecommunications Assoc. 246 E. 6th Avenue, Suite 100 Tallahassee, FL 32303 Susan Masterson Embarq Florida, Inc. 1313 Blairstone Road Tallahassee, FL 32301 Mr. David Christian Verizon Florida, LLC 106 E. College Ave., Suite 710 Tallahassee, FL 32301 Dulaney O'Roark, III Verizon Florida, LLC 6 Concourse Pkwy, Suite 600 Atlanta, GA 30328

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	Docket No. 070298-EI Submitted for Filing: September 6, 2007

PROGRESS ENERGY FLORIDA'S SUPPLEMENTAL RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 20-22)

Progress Energy Florida, Inc. ("PEF"), responds to Staff's First Set of Interrogatories to PEF (Nos. 20-22), as follows:

INTERROGATORIES

20. During the 2004 and 2005 hurricane seasons, what percent of PEF's underground facilities located in Category 1-3 storm surge areas experienced flooding or storm surge damage?

Answer: Forensics and Damage Assessment processes in practice in 2004 and early 2005 did not capture the type of information regarding damaged underground equipment needed so as to allow such data to be segregated into Category 1-3 storm surge areas. Storm outage data, interrupting device location, total damaged facilities, and total facilities in service from 2004 and 2005, however is available, and current (2007) disposition of total facilities relative to Category 1-3 storm surge areas is also available. By employing reasonable approximations supported by available damage and facilities data, an estimate can be derived.

Current (2007) facilities were plotted on top of the category 1-3 storm surge boundary to determine the ratio of overhead (OH) and underground (UG) equipment in and out of storm surge areas. Total facilities in service in 2004 were then divided in the same proportion to approximate the quantity of facilities in storm surge areas in 2004.

Storm outage data was used to approximate the geographic location of storm damage. Storm outage data indicates the specific location of isolating protective devices, not the actual location of damage. By overlaying protective devices reporting hurricane outages in 2004 on the category 1-3 storm surge areas, outages on either side of the boundary were determined.

Using 2004 total facilities data and the total number of OH and UG hurricane outages, approximate damage locations per a device were calculated. Overhead and underground damage is assumed uniform in areas affected by hurricanes. A breakdown of damage locations per a device is shown below:

	UG	Poles	Spans OH	OHTX	Total OH
Damage Locs per Device	0.3197	0.1126	0.4618	0.0475	0.6218

Equipment types used for OH totals were poles, OH spans and OH transformers (OHTX). Equipment type used for UG total was pad mounted transformers. Approximately 22.3% of the total transformers replaced during the 2004 hurricanes were pad mounted transformers.

Damage locations per outage and the ratio of outages in category 1-3 storm surge areas were used to determine number of damage locations in category 1-3 storm surge areas. Below is the breakdown of the damaged facilities for the storm category areas:

Damaged Facilities	Poles	Spans OH	OHTX	Total OH	UGTX
[illegible]	41	170	17	229	1.3
[illegible]	180	738	76	994	14.7
[illegible]	200	819	84	1,103	29.7
[illegible]	209	857	88	1,154	38.7
Total Within Cat 3 Boundary	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

The final step was to calculate failure rates (or percentage of damaged facilities) by dividing the damaged facilities by the total facilities in those storm categories. See the table below:

Failure Rates					
[illegible]	0.25%	0.55%	3.18%	0.17%	3.35%
	0.50%	0.81%	7.40%	0.18%	7.58%
	0.34%	0.52%	4.38%	0.12%	4.50%
	0.36%	0.52%	4.56%	0.05%	4.62%
Total Within Cat 3 Boundary	[illegible]				

These calculations yield an approximate percentage of PEF's underground facilities located in category 1- 3 storm surge area that experienced flooding or storm surge damage, which is approximately 0.67 %. This same calculation yielded the approximate percentage of PEF's overhead facilities in category 1-3 storm surge areas that experienced tree and wind debris damage in 2004 and 2005, which is 1.82 %.

This analysis, however, does not result in a complete analytical comparison between overhead and underground and damage. Because of the path and strength of hurricanes in 2004 and 2005, the vast majority of the land area within the category 1-3 storm surge area saw no flooding. Therefore damage was more consistent with interior sections and not representative of storm surge effects.

A better example of storm surge damage on the PEF system is our experience on St. George Island from hurricane Dennis in July of 2005. While damage was small in scale when compared to the entire system as done in the preceding calculations, the relative impact to underground facilities on St George Island was great. The chart below shows total underground facilities on the barrier island, number damaged by coastal flooding with Dennis, and the percent of total for the island.

St. George Island Facilities and Hurricane Damage			
	130	6	136
	41	5	46
	85	2	87
	42	2	44
	298	15	313
	118	12	131
Percentage of Damage to Total UG			

In summary, a more representative example of storm surge damage is PEF's experience on St. George Island during Hurricane Dennis in 2005. Approximately 42.1% of the underground facilities were damaged due to coastal flooding and storm surge. The differing underground equipment failure rates generated in this response underscores the need for targeted, site specific consideration when evaluating underground as a hardening option.

21. Please provide a detailed list of the underground facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damage during the 2004 and 2005 hurricane seasons.

Answer: As discussed in response to question 20 above, Forensics and Damage Assessment processes in practice in 2004 and early 2005 did not capture the type of information regarding damaged underground equipment needed so as to allow such data to be segregated into Category 1-3 storm surge areas. However, all of St. George Island is within category 1-3 flooding and storm surge area. In July of 2005 Hurricane Dennis flooded the island and resulted in damage to 119 pad mounted transformers and 12 switchgears.

22. During the 2004 and 2005 hurricane seasons, what percent of PEF's overhead facilities located in Category 1-3 storm surge areas experienced extreme wind or wind debris damage?

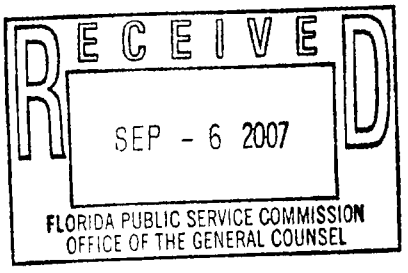
Answer: See answer to question 20.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	Docket No. 070298-EI Submitted for Filing: September 6, 2007

PROGRESS ENERGY FLORIDA, INC's
NOTICE OF SERVICE

Progress Energy Florida, Inc. hereby gives notice of service of Progress Energy Florida's supplemental responses to Staff's First Set of Interrogatories (Nos. 20-22) via hand delivery to Lorena Holley, as counsel for Office of the General Counsel, Florida Public Service Commission.



John T. Burnett, MS

R. ALEXANDER GLENN
Deputy General Counsel - Florida
JOHN T. BURNETT
Associate General Counsel – Florida
PROGRESS ENERGY SERVICE COMPANY, LLC
100 Central Avenue
St. Petersburg, FL 33701
Telephone: (727) 820-5184
Facsimile: (727) 820-5519

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished via U.S. Mail this 6th day of September, 2007 to all parties of record as indicated below.

John T. Burnett

JOHN T. BURNETT

Lorena Holley, Esq. Keino Young, Esq. Office of General Counsel Florida Public Service Commission 2540 Shumard Oak Blvd. Tallahassee, FL 32399-0850 AT&T Florida Ms. Jennifer Kay c/o Nancy Sims 150 S. Monroe Street, Suite 400 Tallahassee, FL 32301 Maria T. Browne Davis Law Firm 1919 Pennsylvania Ave., NW, Suite 200 Washington, DC 20006 Ms. Beath Keating, Esq. Akerman Senterfitt 106 E. College Avenue, Suite 1200 Tallahassee, FL 32301	Florida Cable Telecommunications Assoc. 246 E. 6th Avenue, Suite 100 Tallahassee, FL 32303 Susan Masterson Embarq Florida, Inc. 1313 Blairstone Road Tallahassee, FL 32301 Mr. David Christian Verizon Florida, LLC 106 E. College Ave., Suite 710 Tallahassee, FL 32301 Dulaney O'Roark, III Verizon Florida, LLC 6 Concourse Pkwy, Suite 600 Atlanta, GA 30328

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.

Docket No. 070298-EI

Submitted for Filing: September 24, 2007

PROGRESS ENERGY FLORIDA'S RESPONSES TO STAFF'S SECOND SET OF INTERROGATORIES (NOS. 69-75)

Progress Energy Florida, Inc. ("PEF"), responds to Staff's Second Set of Interrogatories to PEF (Nos. 69-75), as follows:

INTERROGATORIES

69. What is PEF's annual revenue requirements for the Company's Storm Hardening Plan from 2004 through 2009 for each of the following sub-components:

a) Wooden Pole Inspections

b) Ten Storm Hardening Initiatives

c) Compliance NESC Extreme Wind Loading Standards

d) Mitigating flood and storm surge damage to underground and supporting overhead facilities

e) Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance

f) Other Distribution Hardening Activities

Answer:

(Dollars in Millions)

Wooden Pole Inspections

	2004	2005	2006	2007	2008	2009
Revenue Requirement	$ 0.352	$ 0.155	$ 2.305	$ 2.495	$ 2.495	$ 2.495

Ten Storm Hardening Initiatives

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	$ 32.657	$ 38.775	$ 45.509	$ 52.674

Pilot Projects Involving the NESC Extreme Wind Load Standards

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	N/A	$ 0.052	$ 0.190	$ 0.360

New and Pilot Projects Involving Mitigating Flood & Storm Surge Damage to Underground and Supporting Overhead Facilities

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	N/A	$ 0.037	$ 0.096	$ 0.159

New and Pilot Projects Involving Placement of New and Replacement Distribution Facilities to Facilitate Safe & Efficient Access for Installation & Maintenance

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	N/A	$ 0.015	$ 0.064	$ 0.128

Other Distribution Hardening Activities

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	$ 1.438	$ 4.064	$ 5.287	$ 6.509

70. What is PEF's current incremental cost for upgrading a grade C pole to grade B pole for 2007?

a. What is PEF's current incremental cost for upgrading grade B pole to a grade A pole for 2007?

Answer: Depending on the equipment that is on the pole in question, the location of the pole, and any other relevant site-specific factors, the incremental cost to upgrade a grade C pole to grade B pole in 2007 dollars is between $600 and $4000.

a.) The NESC strength requirements for distribution poles are grades of construction B, C and N where grade B is the highest.

71. Is PEF currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?

Answer: Yes, PEF is currently using NJUNS to notify parties of construction activities.

72. If PEF's response to Staff Interrogatory No. 71 is Yes, please give examples of the level of information PEF exchanges using NJUNS.

Answer: PEF uses NJUNS to notify all cable, phone and telecommunication companies that are NJUNS members in Florida if their attachments need to be transferred to a new pole or modified to meet NESC or company construction standard, and to notify all such companies when they need to transfer their attachments to new poles due to pole repair/replacement activity. PEF also uses NJUNS to notify these companies when poles are being moved to accommodate new roads and other similar construction activities. The level of information that PEF provides consists of the pole identification number, local address and date stamps to memorialize the date of the request. Each requesting entity is then given 60 days to complete the NJUNS request before PEF field checks the location and closes out the completed ticket or to resubmit a second request that work was not completed.

73. If your response to Staff Interrogatory No. 71 is No, is PEF planning on using NJUNS in the future for notifying parties of utility construction activities?

Answer: Not Applicable.

74. If your response to Staff Interrogatory No. 73 is Yes, please describe how, when and with whom will PEF use NJUNS to exchange information regarding construction activities.

Answer: Not applicable.

75. Please refer to PEF's response to Staff First Set of Interrogatories, Interrogatory No 54.

What assumptions does PEF believe that third party attachers should use in estimating cost impacts from its plan for the year 2007 through 2009.

Answer: PEF does not believe that third party attachers have to rely on assumptions to estimate cost impacts from PEF's plan other than the assumption that PEF will actually execute its Plan as stated.

AFFIDAVIT

STATE OF FLORIDA)
)
COUNTY OF PINELLAS)

Before me, the undersigned authority, personally appeared J JASON CUTLIFFE, who

(X) is personally known to me, or

( ) produced _____ as identification and who, being duly sworn, deposes and says that the foregoing answers to Interrogatory Nos. 69 through Interrogatory No. 75 of Staff's Second Set of Interrogatories to Progress Energy Florida, Inc., in Docket No. 070298-EI are true and correct to the best of his knowledge, information and belief.

J. Jason Cutliffe
J Jason Cutliffe

Manager, Distribution Asset Performance
Title

** Personally known **
Marcy R. Tromblee
Notary Public
State of Florida

MARCY R TROMBLEE
MY COMMISSION # DD600581
EXPIRES: Oct. 1, 2010
Florida Notary Service.com
(407) 398-0153

My commission Expires: Oct. 1, 2010

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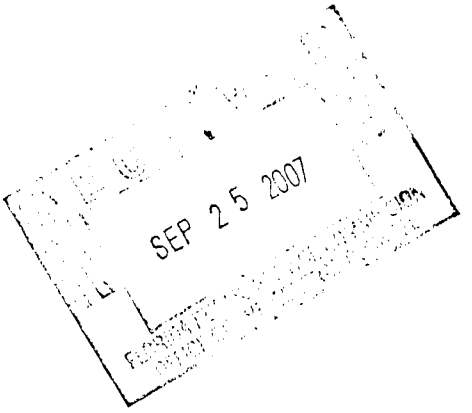

September 25, 2007

HAND DELIVERED

Ms. Katherine Fleming
Mr. Keino Young
Senior Attorneys
Office of General Counsel
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0863

Re: Review of 2007 Electric Infrastructure Storm Hardening Plan
Filed pursuant to Rule 25-6.0342, F.A.C., submitted by
Tampa Electric Company; FPSC Docket No. 070297-EI

Dear Ms. Fleming and Mr. Young:

Enclosed is the original and one copy of Tampa Electric Company's Answers to Staff's Second Set of Interrogatories (Nos. 45-53), propounded and served by electronic and U. S. Mail on September 5, 2007.

Sincerely,

Lee L. Willis

LLW/bjd
Enclosure

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	Docket No. 070298-EI Submitted for Filing: September 24, 2007

PROGRESS ENERGY FLORIDA, INC's
NOTICE OF SERVICE

Progress Energy Florida, Inc. hereby gives notice of service of Progress Energy Florida's responses to Staff's Second Set of Interrogatories (Nos. 69-75) via hand delivery to Keino Young, as counsel for Office of the General Counsel, Florida Public Service Commission.

R. ALEXANDER GLENN
Deputy General Counsel - Florida
JOHN T. BURNETT
Associate General Counsel – Florida
PROGRESS ENERGY SERVICE COMPANY, LLC
100 Central Avenue
St. Petersburg, FL 33701
Telephone: (727) 820-5184
Facsimile: (727) 820-5519

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished via U.S. Mail this 24th day of September, 2007 to all parties of record as indicated below.

JOHN T. BURNETT

Keino Young, Esq.
Katherinr Fleming, Esq.
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Tallahassee, FL 32399-0850

AT&T Florida
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Dulaney O'Roark, III
Verizon Florida, LLC
6 Concourse Pkwy, Suite 600
Atlanta, GA 30328

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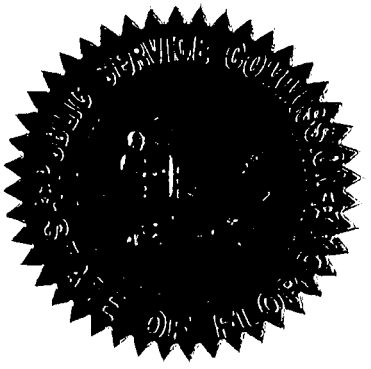
BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of:

REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY TAMPA ELECTRIC COMPANY.	DOCKET NO. 070297-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY PROGRESS ENERGY FLORIDA, INC.	DOCKET NO. 070298-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY GULF POWER COMPANY.	DOCKET NO. 070299-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY FLORIDA POWER & LIGHT COMPANY.	DOCKET NO. 070301-EI

_____/



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THE OFFICIAL TRANSCRIPT OF THE HEARING,
THE .PDF VERSION INCLUDES PREFILED TESTIMONY.

TELEPHONIC
DEPOSITION OF: JASON CUTLIFFE

TAKEN AT THE
INSTANCE OF: The Staff of the Florida
Public Service Commission

FLORIDA PUBLIC SERVICE COMMISSION

PLACE:	Room 362 Gerald L. Gunter Building 2540 Shumard Oak Boulevard Tallahassee, Florida
TIME:	Commenced at 10:00 a.m. Concluded at 12:06 p.m.
DATE:	Monday, September 17, 2007
REPORTED BY:	JANE FAUROT, RPR Official FPSC Reporter (850) 413-6732

FLORIDA PUBLIC SERVICE COMMISSION

APPEARANCES:

LEE L. WILLIS, ESQUIRE, Ausley Law Firm, Post Office Box 391, Tallahassee, Florida 32302, appearing on behalf of Tampa Electric Company.

JOHN SIEVER, ESQUIRE, and MARIA T. BROWNE, ESQUIRE, Davis Wright Tremaine LLP, 1919 Pennsylvania Ave., NW, Suite 200, Washington, D.C. 20006,
appearing on behalf of Florida Cable Television Association.

DULANEY L. O'ROARK III, GENERAL COUNSEL, Southeast Region Verizon, 6 Concourse Parkway, Suite 600, Atlanta, Georgia 30328, appearing on behalf of Southeast Region Verizon.

JOHN BURNETT, ESQUIRE, Progress Energy Florida, Inc., P.O. Box 14042, St. Petersburg, Florida 33733-4042, appearing on behalf of Progress Energy Florida, Inc.

RUSSELL BADDERS, ESQUIRE, Beggs & Lane Law Firm, P.O. Box 12950, Pensacola, FL 32591, appearing on behalf of Gulf Power Company.

KEINO YOUNG, ESQUIRE, FPSC General Counsel's Office, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850, appearing on behalf of the Commission Staff.

Hearing Exhibit - 000239

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MISCELLANEOUS

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CERTIFICATE OF OATH	62

Hearing Exhibit - 000240

EXHIBITS

NUMBER:		ID.
1	(Late-filed Exhibit)	29
2	(Late-filed Exhibit)	37
3	(Late-filed Exhibit)	44

Hearing Exhibit - 000241

S T I P U L A T I O N

IT IS STIPULATED that this deposition was taken pursuant to notice in accordance with the applicable Florida Rules of Civil Procedure; that objections, except as to the form of the question, are reserved until hearing in this cause; and that reading and signing was not waived.

IT IS ALSO STIPULATED that any off-the-record conversations are with the consent of the deponent.

Hearing Exhibit - 000242

P R O C E E D I N G S

MR. YOUNG: Madam Notary, can you please swear the witness in.

(Witness sworn by Notary Public.)

MR. YOUNG: Thank you, Madam Notary.

Good morning again, Mr. Cutliffe. Before we start, we would like to take appearances from everybody who is on the phone and in the room.

I'll start. This is Keino Young, staff legal counsel.

MR. WILLIS: I'm Lee L. Willis, P.O. Box 391, Tallahassee, Florida, representing Tampa Electric.

MR. YOUNG: And in the room with me from staff --

MS. HARVEY: Lisa Harvey.

MR. BALLINGER: Tom Ballinger.

MS. LEWIS: Kathy Lewis.

MR. FISHER: Lynn Fisher.

MS. VINSON: Carl Vinson.

MR. YOUNG: And I guess we can start the attendance with Progress Energy.

MR. BURNETT: Yes. John Burnett on behalf of Progress Energy. In the room with me, Jason Cutliffe.

MS. STRIGHT: This is Lisa Stright with Progress Energy.

MS. ROBANNO: This is Charlene Robanno (phonetic)

Hearing Exhibit - 000243

with Progress Energy.

MR. BURNETT: And, Keino, just for the record, Charlene and Lisa are just listening in.

MR. YOUNG: Okay.

I guess we'll start with Verizon first.

MR. O'ROARK: This is De O'Roark representing Verizon.

MR. YOUNG: FCTA?

If we could, after each company, or each intervenor has been mentioned and their legal counsel, if we can just continuously go around the room, go around the phone.

MR. SIEVER: All right. This John Siever for FCTA.

MS. BROWN: And Maria Brown for FCTA.

MR. GREER: This is Stan Greer with AT&T, and I'm just listening in.

MR. YOUNG: Is that everyone?

MS. KAY: Hi. This is Jennifer Kay with AT&T Florida, I'm also listening in.

MR. BADDERS: This is Russell Badders on behalf of Gulf Power, and I'm just listening.

JASON CUTLIFFE

was called as a witness and, after being duly sworn by the Notary Public, testified as follows:

DIRECT EXAMINATION

Hearing Exhibit - 000244

BY MR. YOUNG:

Q Mr. Cutliffe, can you please state your full name for the record.

A My name is Jason Cutliffe.

Q And how are you employed, Mr. Cutliffe?

A I hold the position of Manager of Distribution Asset Performance with Progress Energy Florida.

Q And how long have you held that position?

A Approximately three years.

Q Mr. Cutliffe, before we get into the questions, just a few housekeeping matters. If at any time you don't understand a question, you can ask me and I'll repeat it or have the court reporter, the Commission reporter repeat the question for you. At any time, if you need a break, you can just let us know and we'll take a break. The way I generally like to do things is I try it take a break every 50 to 60 minutes, okay?

A Thank you, Mr. Young.

Q All right.

Mr. Cutliffe, in your position at Progress, are you required to generally be familiar with the industry storm hardening practices and equipment, including those employed by other utilities?

A Yes, sir, I am.

Q And, Mr. Cutliffe, have you attended the various

Hearing Exhibit - 000245

informal meetings as relates to the storm hardening plan in these dockets?

A Yes, I have.

Q Mr. Cutliffe, are you familiar with Davis (sic) Consulting, Incorporated?

A Yes, I am, as it relates to work they have done for Progress Energy Florida in relation to our storm hardening plan.

Q In your opinion, Mr. Cutliffe, is Davis Consulting, Incorporating, a reputable consulting firm that qualifies -- with qualified and experienced staff?

A Yes, they are.

Q Does Davis Consulting, Incorporated, benchmark analysis indicate better storm practices of Grade B construction over Grade C construction?

MR. BURNETT: Keino, can you repeat that? This is John Burnett, I'm sorry, I didn't hear that.

Q In your opinion, does the date -- well, I'll have Madam Clerk read the question.

(Question read by reporter.)

MR. BURNETT: Object to the form.

Q Mr. Cutliffe, you can answer.

A Could I have the question repeated one more time, please, I wasn't able to hear?

(Question read by reporter.)

Hearing Exhibit - 000246

A I'm not aware of any analysis that Davies has done that compares Grade B and Grade C in terms of storm performance.

Q Can you repeat that again, Mr. Cutliffe?

A I'm not aware of any analysis or comparison that Davies Consulting has performed that compares Grade C and Grade B construction standards as it relates to storm performance.

Q Mr. Cutliffe, does your testimony include analysis of storm performance for Grade C construction versus any other grade of construction?

A Yes, it does.

Q And can you please identify that in your prefiled testimony, the location of that?

A I will reference Page 4, where there are -- I'm sorry, Page 5, the question on Line 12 that includes discussion of extreme wind versus Grade C.

Q Mr. Cutliffe, on Page 18 of your Exhibit JC-2T, and on that exhibit you mentioned primary construction of the PEF distribution system breakdown in the following manner: Would you agree, Mr. Cutliffe, that PEF has a design standard of Grade C and B -- PEF's designed standard of Grade C and B is being implemented 74.2 percent -- 74.2 percent of the time?

A Mr. Young, was that Page 18 of the supplemental filing?

Q Yes.

Hearing Exhibit - 000247

A The page you referenced indicates that as typically constructed, approximately 74.2 percent of PEF's overhead primary construction meets the equivalent wind speed design of Grade B.

Q On Page 16 of that exhibit, the last full paragraph beginning the analysis indicates that for most lines designed on PEF's system, Grade B construction is achieved. This is because the standard pole from PEF's inventory is used as opposed to a low class pole that could be used to meet Grade C standards. Do you see that?

A Yes, sir.

Q Would you agree that these two sentences give an appearance that the company's design standards are not consistent with -- not consistent with the pole inventories or purchased pole, purchase of poles?

MR. BURNETT: Object to the form of the question.

THE WITNESS: Could you repeat, please, Mr. Young?

MR. YOUNG: I'll have Madam Clerk repeat the question.

(Pending question read by reporter.)

A I would not agree with that statement. What those two statements that you have referenced in the supplemental plan filing indicate is that when the economics of supply chain considerations are included in standard poles that are stocked and used for construction, that the typical result is

Hearing Exhibit - 000248

construction that exceeds the minimum of Grade C, but not that the stocking of those poles is in conflict with Grade C.

Q Okay. Then what percentage of your poles is PEF planning to take to Grade B?

MR. BURNETT: Object to the form.

A There is no objective of any portion of the system being built to Grade B, but --

MR. YOUNG: Hold on, Mr. Cutliffe.

I guess your phones are on vibrate. We are getting a strong feedback every time someone's phone rings or anything of that nature, so if you can just for a brief moment can you turn it off and then when we take breaks you can turn it back on and check your messages, if any, because we are getting a strong feedback on this end.

MR. BURNETT: Keino, we have got both of ours off here. I don't know if anyone has got one close to a speaker anywhere else on the line.

BY MR. YOUNG:

Q All right. I'm sorry, Mr. Cutliffe, you can continue.

A There is no objective to bring any particular percentage of the system up to a Grade B wind design equivalent. The statements that are in the supplemental plan filing are simply assessing the percent of our system that as constructed meets those Grade B minimum wind requirements. So

Hearing Exhibit - 000249

I guess there is not a causal effect there. We didn't stock those poles to reach a Grade B construction, but by virtue of the fact that we do stock those poles in order to minimize our supply chain costs, the result is typical construction, which in some cases meets Grade B wind requirements.

Q So Progress is achieving Grade B construction standards, correct?

A As typically constructed, the wind requirement for Grade B is met by the standard poles that we use.

Q Then why not make the Grade B construction standard rather than Grade C?

A Based upon our actual hurricane experience and the data supplied from the restoration activity from 2004, our Grade C construction performed very well and provided the most demonstrated balance of cost and performance. So to design the systems to Grade B would be adding strength that our data tells us does not provide a commensurate value.

Q Mr. Cutliffe, please turn to Page 28 of your Exhibit JC-2?

A Mr. Young, I don't have page numbers on my hard copy of the supplemental filing. Is there an attachment number that you're referencing?

Q I guess it's JC-2T, and it says Page 28 of 46. It's called Davis Consulting -- it's headed Davis Consulting-AIS background. It's under Attachment E.

Hearing Exhibit - 000250

A I have it.

Q Okay. The asset investment strategy is a computer application PEF uses to optimize spending, correct?

A Yes, that's correct.

Q Is it correct to say that Progress' storm plans rely substantially on the AIS being properly used?

A The AIS model is a significant portion of our overall storm plan. I would not characterize it as a substantial contributor to it.

Q Repeat that again for me, please.

A The AIS plan is critical for effective implementation of our pilot approach to testing various design options, but I would not characterize the AIS model as a substantial portion of our overall storm plan.

Q What percentage is the AIS model used in terms of your overall storm plans?

A If I were to break it down in terms of the dollar impact of our total storm plan, $4.2 million is allocated based upon results of the AIS model.

Q And what's the total dollar amount of your storm plans?

A In 2007, our total storm plan is approximately $91 million.

Q Okay. Let's return to the previous discussion on JC-2T, Page 16, where a, "Standard pole from PEF's inventory is

Hearing Exhibit - 000251

used as opposed to a low class pole that could be used to meet Grade C construction." Would you agree that the optimized spending objective, the purpose of using AIS is not achieved in cases where PEF's staff did not install a lower cost pole?

A No, I would not agree with that for the reason that the AIS model is used to prioritize the various design options that are part of the pilot project plan, and the issue of the class of pole being used is driven entirely by the economics of supply chain and minimizing the stock of various pole sizes so that Grade C construction minimums are always met, but in some cases they are exceeded because it's just cheaper to have a half a dozen or so pole sizes in your inventory versus what could be two or three times that if each overhead design were attempted to be optimized to minimum Grade C.

So the AIS model is a means to prioritize an entire portfolio of different design options, whereas the question of the pole class size is strictly related to the cheapest way to build that ensures minimum Grade C and in many cases includes design that exceeds that.

Q In your job capacity at Progress, would you or someone under your direction review the history of storms in PEF's service area, storm category, i.e., size, and the wind speeds?

A Yes, sir.

Q Does your testimony include analysis of the history

Hearing Exhibit - 000252

of storms, storm categories, size, and wind speed impact in PEF's service areas?

A My testimony includes analysis of the results of actual storms on our system which do include a variety of speeds and sizes and landfall directions.

Q Okay. Now, turn to JC-2, that's the exhibit, Page 32 of 46. Are you there, Mr. Cutliffe?

A Could you reference, I apologize, an attachment with that?

Q It's in the same attachment, E. It is JC-2T, Page 32 of 46. We were just at Page 16. Just turn to Page 32 of that same exhibit.

A Okay. I'm there.

Q Mr. Cutliffe, in this exhibit there are several questions. What are these questions?

A These questions are the means by which the relative value of these diverse projects can be ranked against one another in order to determine an overall benefit.

Q Okay. In the first template, the first template of questions on Page 32 asks what is the annual probability of wind over 70 miles per hour in an area serviced by this device. Why was 70 miles per hour picked? Why not 100 miles per hour?

A Seventy miles per hour is the wind speed level that is used in the HAZUS model, and so we incorporated that due to the availability of statistical data for that wind speed. So I

Hearing Exhibit - 000253

would reference the selection of 70 miles per hour back to the HAZUS material, which includes an explanation of how that data is gathered and who gathers it.

Q I guess we have a disconnect. Why not another number? Why not, say, 95 or 100? I guess I didn't understand your response.

A Let me answer it this way, Mr. Young. The 70 miles per hour, the purpose of that question in the AIS modeling was to differentiate different areas of our system in terms of the probability they would be struck with hurricane extreme winds. And HAZUS was a model that already existed, the data had been gathered. And what this question allows us to do is if we are comparing two projects, and I will use an example of one that is on the interior section of the state versus one that is in the coastal area, according to the HAZUS data, the coastal areas were far more likely to experience the wind of 70 miles per hour than the ones on the interior.

So, that data, even though it doesn't match every possible hurricane scenario, it did allow us in a meaningful way to differentiate projects that were in areas less likely to see extreme wind versus projects that were more likely to see it. So while it doesn't attempt to identify the exact wind speed that those projects would see, it does differentiate the likelihood of a hurricane event and, therefore, it gave us the separation between projects that were more or less likely to

Hearing Exhibit - 000254

actually see these conditions.

Q Does Progress Energy Florida's service area include the St. Petersburg area?

A Yes, it does.

MR. YOUNG: Can you give me a second, please.

(Pause.)

BY MR. YOUNG:

Q Mr. Cutliffe, from your review of your service areas for Progress Energy Florida, does any of PEF's customers are located in the basic wind speed above 120 miles per hour?

MR. BURNETT: Object to the storm.

A I have to ask a question. Above 120 miles per hour according to what measure?

Q According to the NESC figures.

A The extreme wind table?

Q Yes.

A Yes, we do have customers located in areas above 120 miles per hour according to that wind table.

Q In terms of the 120 miles per hour, did you include that in your figures in your template questions in terms of what is the annual probability of wind over, say, 120 miles per hour in service areas by this device? Did you include that question in there?

A No, sir; 120 mile per hour wind speeds or areas that in that wind table were not included in the AIS model. As a

Hearing Exhibit - 000255

surrogate for that type of distinction, I have to refer back to the HAZUS model, which used 70 miles per hour as the benchmark. But areas such as St. Petersburg that fall within that 120-mile per hour wind contour line on the NESC map will have a higher likelihood of experiencing 70 mile-per-hour winds. So I guess their relative risk in captured in the HAZUS model in that they are more likely to see 70 if they are on that 120 contour versus, say, a 110 or a 100.

Q Okay. Turning to Page 31 of that exhibit, the first template question on Page 31 asks what percentage of exposure will be hardened? That's the question. The note to the right says that -- in part says, for example, if the project calls for a relocation of final remaining back lot lines in the neighborhood, 100 percent will be entered as the value in this question since at the end of the project the neighborhood will be considered completely hardened. What does 100 percent mean?

A In the context of this question, 100 percent means that all of the facilities that are in a defined segment, and a defined segment is the equipment or the overhead line is behind a protective device. As part of our objectives to reduce storm-caused outages, if an entire segment behind a protective device is upgraded, then the likelihood of achieving reduced outages is much greater than if some percentage less than 100 percent behind a protective device is upgraded.

And the reason being if there is still exposure

Hearing Exhibit - 000256

behind that protective device, there may be less damage, but there likely could still be an outage. So what this question does is it gives a higher weighting to projects that completely upgrade all of the facilities behind a protective device, thus reducing the likelihood of an outage occurring. All projects regardless of what percentage of a segment that they improve reduced likelihood of damage, but when it is taken in the context of preventing an outage, you get more impact when 100 percent of a line segment is addressed.

Q In terms of hardening, if PEF is hardened to 100 percent, will PEF revisit the geographical site for any additional storm hardening?

A Each of the projects that are given a score on the question that we are speaking of of the percent hardened, that answer relates to the specific design option of that project. For example, it might be small wire reconductor of a back lot line. That line segment might at some point in the future be considered for a front lot location. So in that context, Mr. Young, the answer would be yes, that line segment might very well be considered for a different storm hardening upgrade at some point in the future, again, depending on how it ranks in the model.

Q So that means you will revisit that geographical service area?

A Yes, sir. The answer of 100 percent in this model

Hearing Exhibit - 000257

does not remove that line segment from future consideration for upgrades.

Q I would like you to turn to Page 29 of that exhibit, Mr. Cutliffe. Are you there?

A Yes.

Q Are the three category items addressed by PEF using ASI, the ASI model? AIS, I'm sorry.

A I'm looking at Page 29?

Q Yes, 29 of 46.

A Could you repeat the question, please?

Q Are these three categories items addressed by PEF using the AIS model?

A These are the three -- this page shows three of the five different construction types that the model incorporates.

Q So that would be a yes?

A Yes.

Q In the description accompanying the categories on alternative to NESC construction standard is a reference to the Pole Foreman Program. What is Pole Foreman?

A Pole Foreman is a structural design model that accounts for the various loads that a pole experiences, and given an NESC design class and a specific location, conductor sizes, joint use attachments, and various other considerations in construction, the percent of ultimate loading on the pole can be determined with Pole Foreman.

Hearing Exhibit - 000258

Q Is Pole Foreman, the tool, used to address shorter span lengths and higher class poles?

A As it relates to an extreme wind design that would be correct. Pole Foreman could be used to determine maximum span lengths given a fixed pole class and other factors being known and fixed.

Q Can you repeat that? I didn't hear the last part.

A Pole Foreman could be used to determine maximum span lengths given a known pole class and height and then other fixed factors, like loading on the pole, conductor size, joint-use attachments and so on.

Q Looking at that page, Page 29, you said the number of projects listed is one. Can you please clarify what you mean by the number of projects listed is one?

A That means that in our 2007 work plan we have one project that meets the alternative NESC construction standards definition as defined here. So we would have one line segment that has been targeted to be rebuilt to, in this case, extreme wind.

Q And what is that one project?

A Mr. Young, I'm going to take just a moment to look that up so I'm sure that I describe it the same way that it was described in our written filing.

Q Not a problem. Take your time.

A Mr. Young, that is described on Page 46 of 46 as

Hearing Exhibit - 000259

Feeder X220.

Q I didn't hear the last part. Say that again.

A It is described on Page 46 as project name Feeder X220.

Q Feeder X220.

A With a total rank of 21.

Q Mr. Cutliffe, you listed one project, correct?

A Yes.

Q All right. Now, under alternatives to NESC construction standard, the last sentence, it says locations have been chosen to provide contrasting performance data between open coastal and inland heavily treed environments.

I'm sorry, I'm being commanded to slow down. Excuse me.

The sentence reads the locations have been chosen to provide contrasting performance data between open coastal and inland heavily treed environments. Based on that last sentence, why not two projects?

A The language that you just quoted from describes how the candidate projects were selected, and the number to the right of there, the one indicates those that were chosen for construction in 2007. So there were segments that were evaluated that were within those categories. But based on our ranking model, which again ties back to our actual hurricane experience with our pole plan, one of those candidate projects

Hearing Exhibit - 000260

was chosen for construction. So I guess I draw the distinction between the text which describes how the candidates are selected and the number to the right indicates which were actually chosen for construction in 2007.

Q So where are they ranked out at?

A On the summary of projects, Page 46 of 46, there aren't any of the other candidates shown. What is shown on this document are those that -- well, obviously these are the top 36. The other extreme wind projects would be ranked below that 36 project, so there is only one shown on this list, which is the Feeder X220.

MR. YOUNG: We're going off the record for one second.

(Off the record.)

BY MR. YOUNG:

Q Mr. Cutliffe, back on the record. For the ones that are not listed, what are their rankings?

A I'm sorry, if I could clarify. The list of 36 projects constitutes, at this point in time, our three-year plan for the hardening pilot project construction. And other line segments that were considered for extreme wind did not rank high enough to make the list of the three-year project. So until we collect data and are able to either identify new segments or we find results that contradict our original assumptions, this list of 36 would remain as our construction

Hearing Exhibit - 000261

plan for the three years, and there would, in fact, be one extreme wind project on that list.

Q Then my question is you said it didn't -- you mentioned that it didn't rank in the 36. How is that number determined, the top 36?

A The 36 are ranked in order of their total value, which is a numeric reflection of the questions we spoke of earlier. It's a weighted numerical score for each project.

Q So how did you get the cut-off number to be 36?

A The cut-off number of 36 was arrived at to approximate the amount of capital that we had forecast to invest in these pilot projects. Now, having said that, that may change as projects are constructed and designed and some real world considerations come in, but that's where the line of 36 was drawn, I guess, so as not to create an overly ambitious list, but also to ensure that we had a sampling of the design options that we felt through this modeling had merit.

Q Mr. Cutliffe, next to the total rank is total value, and the last, number 36 is 2.2727.

A Yes.

Q How was that number determined? I mean, in terms of the projects that did not make the list, what is the base line of total value? Is 2.2727 the base line?

A No, sir. The list was not limited by the rank, the total value score, or the AIS score. It was based upon the

Hearing Exhibit - 000262

estimated project cost and the associated accumulated or cumulative costs of these projects, and that running total was compared to our projections for spending on these projects over the three-year period. So the criteria for a cut-off at number 36 was driven primarily by the financial requirements of these projects, and then the total value score was the number that was on that project when the funds were exhausted.

Q So, Mr. Cutliffe, how is that incremental to what you already -- Progress Energy already planned to do.

A I would characterize all 36 of these projects as incremental to previous PEF plans.

Q Mr. Cutliffe, do you have the list of all the projects and how they are ranked, besides the 36 that is listed?

A There are or I should say there were drafts of project lists that were used throughout this process. And as the scoring process was refined and it was improved, there are projects that were considered that aren't on this list. But, I mean, this is the final list. So as we improve our plan and learn as we go, we will go through the project identification process that's described in this supplemental filing, and we will add to this list of 36 and re-rank as appropriate. But to be clear, this list of 36 is our entire three-year plan for hardening projects at this time.

Q Okay. What percentage does this list encompass of

Hearing Exhibit - 000263

all your projects that were analyzed?

MR. BURNETT: Keino, this is John. I'm sorry I cut you off. I was objecting, but I didn't think you were finished. Could you state that one more time?

MR. YOUNG: I will have Madam Clerk state it.

A If I were to characterize the total number of project segments that were at one point or another considered through this process, it would be a guess on my part as to what percent this 36 is. I would state that these 36 projects are the final result of the AIS process. And for me to describe some of the drafts and the initial shots would just be a guess on my part. But to answer your question, I would guess this represents half of the total population that was at one time under consideration.

Q To the best of your knowledge, what was the total value of the 37th project?

A Approximately $15 million, within that order of magnitude.

Q No, based on the chart that you had, total rank and total value, number 36 on the chart is 2.2727, correct?

A Yes.

Q What was the 37th total value?

A That I wouldn't know. Again, that would have been part of an earlier draft. And the projects that were included are -- I guess this is the final list of projects, so I do not

Hearing Exhibit - 000264

know what the total score would have been on the 37th project.

MR. YOUNG: John, do you think we can get that as a late-filed exhibit?

MR. BURNETT: Sure, Keino. I would be happy to see if that stuff is still around. I guess what you are asking for is any of the other projects that were considered, if they were ranked out, how they ranked and what they were?

MR. YOUNG: Yes.

MR. BURNETT: Sure.

(Late-filed Exhibit 1 marked for identification.)

BY MR. YOUNG:

Q Keeping on Page 29, Mr. Cutliffe, you said there are three surmisable UG projects. What is UG? What does UG mean, stand for?

A Undergrounding.

Q Okay. Who initiated the projects, these projects?

A The original list of projects was collected through some brainstorming sessions that included engineers involved in reliability analysis and operations, as well as some of our field staff operation center managers and foremen, front-line supervisors.

Q Did they receive input from the city, the developers, the customers, or was it strictly Progress staff?

A There was no direct input from cities, developers, or others.

Hearing Exhibit - 000265

Q Now, you asked for back lot. Your testimony indicates that there is one back lot to front loss conversion projects listed. Did the customer, developer, city, or PEF initiate that project?

A PEF identified that as a potential project.

Q Turn to Page 28. Just flip back one.

A I'm there.

Q In this exhibit on Page 28 you show ten small wire upgrades as storm hardening activities to better resist conductor breakage from falling branches and debris.

A Yes.

Q Is storm hardening the only reason for PEF's upgrade the small conductor wiring size to large wire size?

A No, it's not. There are other operating considerations that drive small wire upgrade projects. I would draw the distinction here in that we have reliability metrics that make a business case for small wire reconductor. For example, frequent outages, the cost to restore, the impact on our reliability metrics. What this AIS analysis introduced is the storm hardening consideration in terms of those projects. So even though the construction activity is the same as we do in other places, the means to evaluate those small wire upgrades was different. In other words, these projects would not have been included in our normal work because they didn't meet the criteria that we traditionally had used to evaluate

Hearing Exhibit - 000266

small wire upgrades.

Q Okay. I'm glad you mentioned that.

How does PEF distinguish between a small conductor wire upgrade to address growth from a small wire upgrade to address storm hardening?

A Could you repeat the question, please.

Q I will ask the Clerk to repeat the question.

(Requested portion read back.)

A When a small wire primary segment is reconductored due to growth, that conductor is overloaded thermally. When a small wire segment is reconductored for storm hardening, it has ranked highly under the AIS questions discussed earlier.

Q What is the total number of small wire upgrade projects PEF currently has planned?

A Under the work plan as described through the AIS model that number would be ten. I don't know off the top of my head how many we have beyond that were (inaudible).

Q Can you repeat the last part of your answer.

A I don't have readily available the number of small wire projects that are in our work plans that aren't related to loading.

Q Keeping on Page 28 of that exhibit, it shows that 21 overhead to underground conversion projects as storm hardening projects. Do you see that?

A Yes.

Hearing Exhibit - 000267

Q How many of the 21 projects were initiated by PEF?

A All of them.

Q Did PEF collect or request funds from the affected customers or municipalities for these projects?

A No.

MR. YOUNG: Mr. Cutliffe, I think what I'll do right now is give everyone a chance to have a five-minute stretch. So we'll be back in five. You can just mute your lines until we come back. Okay?

THE WITNESS: Okay.

(Recess.)

MR. YOUNG: All right. We're going to go back on the record.

BY MR. YOUNG:

Q Mr. Cutliffe, for clarification purposes, earlier I asked you about the input from customers and developers and the cities to the AIS template. I believe you responded no input was solicited. What about from third-party attachers?

A There was no direct input from third-party attachers in the selection of the segments to be evaluated.

Q Isn't third party impact a part of the AIS evaluation analysis?

A Yes, it is.

Q On Page 46 of 46 of your Exhibit JC-2T --

A Yes.

Hearing Exhibit - 000268

Q -- there's a column that calls for third-party impact ranked and third-party results. If there was no input, if no input from third parties were given, can you please explain the numbers on that column, on both of those columns?

A Based on the type of construction under consideration and our past experience with third-party impacts, the relative magnitude of impact of third parties was approximated.

Q So there was no feedback given, feedback from third parties in these numbers, in this AIS model?

A Not directly, no.

Q So how can we interpret -- how should we interpret these numbers?

MR. BURNETT: Object to the form.

A Mr. Young, I'll refer to Page 34 of 46. And to answer your question, the relative value as described on the question what type of investment, if any, is required by joint users to complete this project, the level of activity based on our historical experience that would be required by a third-party attacher to move their facilities associated with these projects was ranked as shown on that page. And that's how the relative ranking of the third-party metric was included.

Q Earlier you mentioned total rank 21, right, Feeder X220?

A Yes.

Hearing Exhibit - 000269

Q On Page 46 of 46. Third-party impact is ranked 23. Third-party impact results, .27. How did you derive those numbers since it is the only project that you have listed to rank it Number 21?

A Could you repeat the question, please?

Q I'll repeat it. On Page 46 of 46 you have total rank down the line, you have one through 36, and you have total rank Number 21. Looking at total rank Number 21 is Feeder X220, extreme wind upgrades, south coastal. Do you see that?

A Yes.

Q Under the third parties you have third-party impact ranked Number 23. You have got third-party impact results, .27. How are those numbers determined if you didn't receive any input from third-party attachers?

A That number of 0.27 would have been derived from the question as defined on Page 34 of 46 where it says for extreme wind upgrades, the third-party impact would be transfer at the same location. So the relative weighting of that activity versus either a relocation or a conversion to underground would have resulted in the .27. The third-party impact rank of 23 shows where that project ranks with only the third-party impact as a measure, and those are in order of higher number means higher impact.

Q So can you explain rank number two in terms of 1 and .5 in St. George Island Plantations, and looking at the

Hearing Exhibit - 000270

third-party impact ranked -- third-party impact results, how are we to interpret those numbers? I'm sorry, did you hear my question? No, I'm sorry.

On the top of rank number two, St. George Island Plantation?

A Yes.

Q Mr. Cutliffe, you have the third-party impact ranked number one, third-party impact results, .5. Can you explain how you derived at that number? Those numbers, rather.

A The submersible underground construction type that is represented by that project is a modification to existing underground. So based on the assumptions described earlier, there was the least impact to third-party attachers for work targeted at existing underground. That's why, again, as the third-party impact rank higher, meaning more impact to third parties, this is ranked very low because it would be very low impact to third parties.

Q Focussing on the chart, Page 46 of 46, in terms of ranking, you have got it ranked one through 36. What is the controlling factor that determines how the project is ranked? I think you might have answered it, I'm not too sure.

A The ranking of 1 through 36 is based on the total value of each project.

Q When you say total value, what do you mean? Capital in terms of money, or total value in terms of the second, the

Hearing Exhibit - 000271

second number, the second column?

A In total value versus the second column.

Q Mr. Cutliffe, if you can turn to Page 18 of your testimony?

A Yes.

Q Line 15. You said while wind simulators and other similar devices may provide some limited data, do you see that?

A Yes.

Q Based on that quote, did Progress in its assessment of storm hardening use or gather information from other wind simulators or other similar devices?

A No.

Q Does your testimony specifically identify any results from wind simulation and other similar devices?

A It describes no results.

Q Now, if you can turn back to your Exhibit JC-2T, Page 13 of 46?

A Yes.

Q Do you see the annual cost amount under the heading actual/estimated utility costs?

A Yes.

Q Are all of these amounts operation and maintenance expenses, or do the amounts include capital expenditures, as well?

A They include both O&M and capital.

Hearing Exhibit - 000272

MR. YOUNG: Well, in that case, John, can we have a late-filed exhibit of the revenue requirements for each group of storm hardening activities and the total revenue requirements from all storm hardening activities as a late-filed exhibit, revenue requirement 2004 to 2009?

MR. BURNETT: Keino, you said -- this is John Burnett. You actually have a discovery request out, I think, for that very information, but you just said '04 through '09 here, and it's '07 through '09 in your discovery. Are you asking for something different?

I mean, absolutely you can with '07 to '09, we were preparing that and are close to having it finished now, but I believe you said '04 through '09 here.

MR. YOUNG: Well, '07 through '09 is fine. And for the court reporter, I was told I was speaking too fast. It is the late-filed exhibit of the revenue requirements for each group of storm hardening activities and a total revenue requirement for all storm hardening activities. And it will be labeled revenue requirements 2007 through 2009.

MR. BURNETT: John Burnett. Yes, you may.

(Late-filed Exhibit 2 marked for identification.)

BY MR. YOUNG:

Q Keeping on Page 13 of 46. Do you see the annual cost amounts under the heading -- I'm sorry, one moment please. I think I might be able to shorten some of these questions.

Hearing Exhibit - 000273

Mr. Cutliffe?

A Yes.

Q Do you see the -- using the exhibit, Page 13 of 46, JC-2T?

A Yes.

Q Do you see the annual cost amounts under the heading actual/estimated utility costs?

A Yes.

Q The columns headed impact on storm restoration costs are the cost amounts PEF estimates are the reduction in storm restoration costs, correct?

A Yes.

Q The column to the left would be the cost PEF has projected to incur to derive the estimated reduction in storm restoration costs, correct?

A Yes.

Q Could you please look at Lines A through K under the actual/estimated cost utilities?

A Yes.

Q The company doesn't show any value for impact on storm restoration costs, correct?

A Correct.

Q Why doesn't the company show any value on the impact of storm restoration costs?

A Could you repeat the question, please?

Hearing Exhibit - 000274

MR. YOUNG: I'll ask the Clerk to repeat it.

(Requested portion read back.)

A Because of the activities described.

Q Can you repeat that again?

A I'll refer to the footnotes in those.

Q Uh-huh, yes.

A Footnotes A and B.

Q Yes.

A Bases are addressed in the wood pole inspection plan and the EIW storm preparedness plan.

Q So we can derive the impact on storm restoration costs from those two dockets?

A Yes.

Q Do you believe that -- do you believe PEF's plan addresses the Line Items A through K are likely to reduce storm restoration costs?

A Yes. We believe that Items A through K will drive lower restoration costs than if they were not implemented.

Q Why is that?

A Because these items are critical parts in any sound storm hardening plan.

Q When PEF incurs storm restoration costs, it charges those costs against its storm reserve, correct?

MR. BURNETT: Object to the form.

A Could you repeat the question, please?

Hearing Exhibit - 000275

Q When PEF incurs storm restoration costs, it charges those costs against its storm reserve, correct?

A Yes, when certain tests for severity are met, that's the case, yes.

Q And to the best of your knowledge, PEF's storm damage reserve is a component of PEF's base rates, correct?

MR. BURNETT: Object to the form.

A To the best of my knowledge, yes, there is some level of storm reserve in base rates.

Q So if hardening is successful, would you expect a reduction in the storm reserve components of the base rates?

MR. BURNETT: Burnett objects to the form.

A I would expect so, yes.

Q The remainder of the line items are L through O on Page 13 of 46?

A Yes.

Q It does not show estimates or impact of storm reduction costs, correct?

A There are impacts shown for Line N.

Q Okay. You said Line M?

A Yes, I'm sorry, M as in Michael.

Q What about L, N, O?

A I'll take these one at a time. Line L describes extreme wind applications for distribution facilities, for new facilities, and since our plan calls for none, there is no

Hearing Exhibit - 000276

change shown there. And it would be the same response for Row N, as well.

Q What about O?

A O references underground and storm surge mitigation for transmission, which also is not included.

Q And why is that?

A To the best of my knowledge we have no underground transmission in defined storm surge areas.

Q Okay. So based on that, would you agree that even though PEF does not estimate a dollar amount, the benefits to reduce storm restoration costs for some of these line item activities are nonetheless cost-effective?

MR. BURNETT: Burnett objects to the form.

A With regards to Lines L and N which address distribution, I would disagree with that statement. I would disagree that there is any storm benefit to extreme wind for distribution. With regard to Row O for transmission, I would be speculating at any benefit for transmission underground, as to the best of my knowledge we have none.

Q Earlier you mentioned the prior proceedings, and for the record that is Docket Number 060078-EI and 060198-EI, correct?

A Yes, that's correct.

Q And in the prior proceedings, addressing Lines A through K, did the Commission find that the company's plan, if

Hearing Exhibit - 000277

implemented, was reasonably expected to achieve reduced storm restoration costs and storm outages to affected parties?

A I don't recall the specific assessment that was the result of the review of those plans. I don't recall if that exact language was used.

Q Let me ask you, you have read the two dockets, you've read the order from the two dockets just mentioned, correct?

A I'm familiar with them, yes.

Q In the prior proceedings addressing Lines A through K, did the Commission or the company use a benefit-to-cost ratio to determine the cost-effectiveness of PEF's plan to each line item?

A Could you repeat the question, please?

(Question read by reporter.)

A (Continuing) For the wood pole inspection plan, the answer is yes. And on the ten-point plan, or the EIW storm preparedness plan, I don't recall that specifically being addressed, though I would imagine that certainly would be part of the consideration.

Q Mr. Cutliffe, what is the estimate of total incremental cost for previously approved hardening activities, i.e., vegetation management, pole inspection, PURC studies, et cetera?

MR. BURNETT: Keino, this is John Burnett. Are you wanting him just to go to our respective ten-point plans and

Hearing Exhibit - 000278

the pole inspection plans, look them up and give you the figure?

MR. YOUNG: Yes.

MR. BURNETT: Okay. Well, I would note the documents speak for themselves. But if you want him to do that, we will be happy to.

MR. YOUNG: All right. (Pause.)

John, is it possible for you guys to provide that later to us in a late-filed exhibit?

MR. BURNETT: Yes, sure. I mean, again, all of those are on file with the Commission, but --

MR. YOUNG: I think in terms of -- because of time, let's move on.

BY MR. YOUNG:

Q What I was going to ask you next, Mr. Cutliffe, is what is the estimate for the company's proposed hardening plan in this docket?

A The total for 2007 is approximately $91 million.

Q Do you have those numbers for 2008 and 2009?

A Yes. 2008, approximately 98 million; and 2009, approximately 99 million.

MR. YOUNG: John, if you can provide all of that in one document in terms of the estimate of total incremental cost from the previously approved hardening initiatives, vegetation management, pole inspection, PURC studies, et cetera, along

Hearing Exhibit - 000279

with your costs for 2007, 2008, and 2009 as a late-filed exhibit.

MR. BURNETT: This is John. Will do.

MR. YOUNG: Okay.

(Late-filed Exhibit 3 marked for identification.)

BY MR. YOUNG:

Q Mr. Cutliffe, what is the incremental cost expressed in a rate per 1,000 kilowatt hour?

MR. BURNETT: Object to the form.

A I don't have that readily available.

MR. YOUNG: John, can you include that also in that sheet as a late-filed, along with that late-filed exhibit?

MR. BURNETT: Keino, you said what is the impact. The impact of what?

MR. YOUNG: The impact of the proposed storm hardening plans as a rate impact on the per 1,000 kilowatt hour.

MR. BURNETT: Keino, this is Burnett.

Just to make sure I understand, the figures that Mr. Cutliffe gave for '07, '08, and '09, the 91, 98, and 99, roughly, figures, you want the rate impact per 1,000 kW?

MR. YOUNG: Yes.

MR. BURNETT: Okay.

MR. YOUNG: Also for the ten-point initiatives, as we previously discussed. Okay?

Hearing Exhibit - 000280

MR. BURNETT: Okay.

BY MR. YOUNG:

Q Mr. Cutliffe, I have about another, say, ten questions for you and I will be through.

Would you agree that the previously approved initiatives are mostly annually system-wide activities?

MR. BURNETT: Burnett objects to the form.

A Yes. In application, the ten-point plan and the wood pole inspection plan apply to the whole system.

Q And would you agree, Mr. Cutliffe, that the proposed hardening plan in this docket is a three-year look ahead that is subject to change as more information is gathered and costs are refined?

A Yes, sir, I do.

Q And would you agree that the two aspects of previously approved hardening initiatives in this current docket are complementary to each other?

A Absolutely, yes.

Q And would you agree that the company is responsible for pursuing the most cost-effective hardening projects?

A Yes.

Q And would you agree that the Public Service Commission expects each utility to prudently manage its resources?

A Yes, sir.

Hearing Exhibit - 000281

Q Earlier last week Mr. Butler sent out an attachment that calls for the third-party attachment process. Are you familiar with that?

A Yes, I am.

Q To your knowledge has PEF agreed to the revised third-party attachment process?

A Yes, we have.

Q Has PEF made any attempts to update its third-party attachment cost/benefit information filed in its plan?

A Not at this time.

Q Why not?

A Those costs will be updated as soon as we have information to improve the method that was used in the initial prioritization. So we will work with the third-party attachers and certainly incorporate what we learn from construction this year.

Q Does the PEF plan filed with the Commission include cost/benefit data from all affected third-party attachers in your service territory?

A Strictly speaking, no. What we include is the relative impact in terms of cost in our prioritization model. We make no representation as to the benefits to third-party attachers.

Q Can you repeat that again, please. I didn't hear the last part.

Hearing Exhibit - 000282

A No, we don't directly include cost and benefit in terms of dollars to third-party attachers with our projects. We do include the relative impact in terms of costs for these projects, but we make no representation in our data as to the financial benefits to the third-party attachers.

Q And why not?

A What we have shown is based on our data, our best estimation of benefits to PEF, and we provided that information to third-party attachers for their use in calculating cost/benefit on their equipment.

Q Was that a requirement of the plan to include cost/benefit data from all affected third-party attachers?

A Yes.

Q And I think you just said it wasn't in your plan, correct?

A We don't say for sure. The inherent assumption in our calculations is that they would see a benefit commensurate with what we found for our own facilities.

Q In general, does PEF's pole joint use agreement with third-party attachers currently assign financial responsibility when a pole is overloaded or when an attachment is unauthorized?

A Yes.

Q My final question is can you characterize your agreement on pole replacements?

Hearing Exhibit - 000283

MR. BURNETT: Burnett objects to the form.

A Could you clarify? When you say pole replacement, is that related to pole maintenance; is it pole change-outs?

Q Pole change-outs.

A Could you repeat the question, please?

Q Could you please characterize your agreement on pole replacement as relates to pole change-outs?

A In the context of cost, or the transfer activity, or both?

Q In terms of who is responsible and cost?

A For poles that Progress Energy owns and initiates the change for, PEF is responsible for the cost and the installation of the replacement pole. The third-party attachers are then notified of the transfer and they are then responsible for the transfer of their facilities.

MR. YOUNG: Thank you. That's all I have.

Thanks, Mr. Cutliffe. Thanks, John.

MR. BURNETT: Thanks, Mr. Young.

MR. O'ROARK: Verizon has no questions.

MR. SIEVER: FCTA does have questions, but I didn't know if the witness would like a five-minute break, or if somebody else wanted to go before us.

John?

MR. BURNETT: A five-minute break would be great, if you don't mind.

Hearing Exhibit - 000284

MR. SIEVER: Not at all.

MR. YOUNG: We're trying to see who all else has questions. FCTA has questions. Who else has questions?

MS. KAY: AT&T Florida does not have questions.

MR. YOUNG: All right. So when we return it will be FCTA.

(Recess.)

MR. SIEVER: Thank you, Mr. Young. And thank you, Mr. Burnett.

CROSS EXAMINATION

BY MR. SIEVER:

Q Mr. Cutliffe, my name is John Siever. I am one of the lawyers for the Florida Cable Telecommunications Association referred to as FCTA. I'm going to ask you a few more questions, and forgive me if I go back over a little bit of what you have testified to set my question up, just bear with me. But if I misstate or mischaracterize anything you might have said earlier, feel free to correct me. I'm doing it from my notes.

One of the things, and maybe working backwards a little bit, I wanted to ask you about has to do with extreme wind. And you had been asked some questions by Mr. Young, I believe, about the AIS program, and the discussion was about whether winds in excess of 70 miles an hour or winds in excess of 120 miles per hour were being considered. Do you remember

Hearing Exhibit - 000285

that?

A Yes.

Q My question to you is, in your opinion, is not addressing 120-mile an hour extreme winds a problem for your plan or your model?

A I don't believe that it introduces any error to the model because the actual number that is used in the model to prioritize projects is not related so much to the wind speed as it is to the probability that an area will see that wind speed. So inherent in that, if an area is more likely to see 70 miles per hour, it is very closely related to the number that it would be likely to see 120. So since we are using a number that is a likelihood of an area seeing that level of wind, that isn't going to change a whole lot for varying wind speeds.

Q And, Mr. Cutliffe, as far as you understand it, would the varying wind speeds, either at 70 or 120, have a material effect on pole failures when it is debris, or vegetation, or the like that is part of the pole failure?

A No, sir. Our actual experience indicates that there is no material difference.

Q And in your experience, have you found poles to fail solely because of wind speed?

A We have very rarely, on the order of five percent of total poles that fail in a hurricane.

Q And so you know if those are distribution, or

Hearing Exhibit - 000286

transmission, or a mix?

A That is distribution.

Q And for the distribution poles, do you know if those were, the five percent or so were mostly coastal?

A In our data we do not have a breakdown of geographic location relative to coastal versus inland.

Q Mr. Cutliffe, continuing on. We spent some time, or Mr. Young spent time with you on that Page 46 of 46, the projects, the 36 projects. Do you remember that?

A Yes.

Q And would it be fair to say that of those projects, most of them are going from overhead to underground? (Pause.)

I'm sorry, did you already respond?

A No, I'm sorry, I'm pulling the page up now.

Q I'm sorry.

A Mr. Siever, in looking at the project list, I would say yes, a majority of the construction type are shown as overhead-to-underground conversion.

Q And just knowing what you know from your experience or understanding or recollection, do you know if most of those conversions will involve a rerouting of the path of the line?

A They all involve undergrounding essentially in place where the overhead exists.

Q And do you recall, were you familiar with the answers that Progress gave to staff interrogatories?

Hearing Exhibit - 000287

A I'm familiar with them, yes.

Q And to speed things up, I'll make a reference to Number 30 where the staff was asking about the costs or estimated costs to third-party attachers for the movement from overhead to underground, and the response was that third-party attachers will need to determine if they will attach to any new overhead facilities and they may determine not to move their facilities to the underground location. Are you familiar with that answer?

A Yes, I am.

Q In your understanding, then, if you move to underground, will you leave the pole in place in that line for a third party cable attacher to remain attached?

A If an attachment exists, yes.

Q And would Progress continue to own that pole or would that be a pole that would then be maintained or purchased by the cable attachers?

A To the best of my knowledge, we would attempt to transfer ownership to the third-party attacher.

Q As far as the movement from overhead to underground is concerned, have you been aware in your examination of pole failures of any of the cable operators' attachments on a particular pole being the cause or the primary cause of a pole failure?

A We have no data that indicates third-party

Hearing Exhibit - 000288

attachments were the primary cause.

Q And as far as your understanding and experience is concerned, are you aware of any instance where an overlashed, in other words, what I'm talking about is not the original strand with conductor, but additional conductors overlashed were a cause of any particular poles failure or the primary cause?

A Again, we have no data to indicate that a third-party attachment was a primary cause of a pole failure.

Q As far as the Pole Foreman software that you were talking about with Mr. Young is concerned, I believe you mentioned that the two extreme wind design parameters are shorter spans and higher class of pole, is that right?

A That is correct.

Q Do you know in the extreme wind design under Pole Foreman that there is a provision for considering either storm guying or the lateral effect of pole guying of the lines that are on the poles?

A I'm familiar with those considerations.

Q And do you know if they are part of the Pole Foreman software, or is there a way for them to be put into consideration in determining whether a shorter span or a higher class is needed?

A I'm aware that those are parameters of the Pole Foreman models. I'm not the expert to speak to, from an

Hearing Exhibit - 000289

engineering perspective, how they are actually incorporated.

Q Then I think you will have an easy answer for my next question. I was going to ask you if you considered storm guying or the lateral effect of guying -- when I say you, I mean Progress -- as part of your storm hardening techniques?

A I'm sorry, Mr. Siever, could you repeat the question, please?

Q Surely. I want to ask you whether or not as part of the storm hardening techniques, I presume using Pole Foreman then, you would consider the lateral effect of guying as well as storm guying? And I understand this is just for the extreme wind design that you are doing for the pilot project or for transmission poles, I understand that.

A To the best of my knowledge, the assumptions that would go into Pole Foreman for any type of pole analysis, whether it were extreme wind for a pilot project or a normal analysis for an attachment, that those assumptions regarding storm guying and lateral guying from other conductors would be consistently applied.

Q And as far as extreme wind is concerned, I believe you testified you are only applying that for transmission structures that are 60 feet and higher, is that right, or is it all transmission structures?

A All wood transmission poles are being changed out to concrete and steel consistent with the NESC extreme wind.

Hearing Exhibit - 000290

Q And as far as the 60-foot demarcation point, that is based on the NESC, is that right?

A Yes.

Q And as far as the restoration costs that are involved when a concrete or a steel pole fails, are those costs generally more expensive than for a wood pole?

A They are. The pole itself costs more.

Q Do you know if the third-party attacher costs for a concrete or steel pole are higher than for a wood pole?

A To the best of my knowledge, the rents are not contingent upon type of pole.

Q I guess I meant more of the -- I will ask you about rents -- but more of the make ready, traditional make ready for making an attachment or for doing a transfer?

A To the best of my knowledge, in a hypothetical, if a more expensive concrete pole had to be upgraded for make ready versus a less expensive wood pole, then in that example it would cost more for concrete.

Q You had mentioned about the pole rental, and I wanted to ask you, Mr. Cutliffe, are you familiar with the FCC's pole rental formula calculation?

A I am not.

Q Have you ever been exposed to the pole rental calculations done by someone in your organization?

A I have very limited knowledge of the FCC pole rental

Hearing Exhibit - 000291

calculation. It's a function that is performed outside of my department.

Q All right. Just so I'm sure then, you would not be able to opine on the impact on the FCC's pole rental formula of any of the storm hardening techniques that are being applied?

A Yes. That would be outside of my area of expertise.

Q Are you familiar with any of the FCC's orders on resolution of issues with respect to overlashing?

A No, I'm not.

Q Are you familiar with the third-party attachment standards that are part of Progress standards for permitting for overlashing?

A I'm familiar with those, yes.

Q And is it true that those changed in 2004?

A I believe that is correct, yes.

Q And the change was to require a permit for all overlashing, is that right?

A That's my understanding.

Q And was your understanding also that that -- not just the initial overlash on the strand for an initial installation, but then any subsequent overlash of any additional cable?

A That's my understanding, yes.

Q But you are not aware, I presume then, of any FCC orders or decisions concerning a utility's ability to require permitting for overlashing?

Hearing Exhibit - 000292

A I'm not aware of any, Mr. Siever, but I would expect that those are the issues we are going to put on the table on the meeting scheduled for the 20th in addition to the Pole Foreman questions, and with the full expectation that those are all resolvable issues to everybody's satisfaction.

MR. SIEVER: Well, Mr. Cutliffe, with that answer that concludes my questioning.

Thank you very much.

MR. YOUNG: John, do you have any questions?

MR. BURNETT: No, I don't, Keino.

MR. YOUNG: Okay. I guess that I everyone. Thank you, Mr. Cutliffe.

This concludes the deposition.

(The deposition concluded at 12:06 p.m.)

Hearing Exhibit - 000293

ERRATA SHEET

DO NOT WRITE ON TRANSCRIPT - ENTER CHANGES HERE

IN RE: DOCKET NO. 070297-ET, et al.
NAME: JASON CUTLIFFE
DATE: September 17, 2007

PAGE	LINE	CHANGE

CERTIFICATE OF OATH

STATE OF Florida

COUNTY OF Pinellas

I, the undersigned authority, certify that Jason Cotliffe personally appeared before me at Progress Energy Florida 299 1st Ave. No. St Petersburg FL 33701 and was duly sworn by me to tell the truth.

WITNESS my hand and official seal in the City of St Petersburg, County of Pinellas, State of FL, this 17th day of September, 2007.

SANDRA COPE
Notary Public - State of Florida
My Commission Expires Mar 8, 2010
Commission # DD 512206
Bonded By National Notary Assn.

Notary Public
State of Florida

Personally known ✓ OR produced identification _____.

Type of identification produced _____.

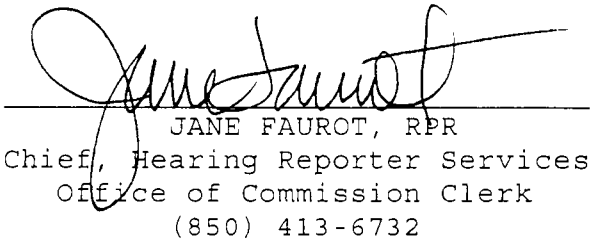
STATE OF FLORIDA)
: CERTIFICATE OF REPORTER
COUNTY OF LEON)

I, JANE FAUROT, Official FPSC Commission Reporter, do hereby certify that I was authorized to and did stenographically report the foregoing deposition at the time and place herein stated.

I FURTHER CERTIFY that this transcript, consisting of 60 pages, constitutes a true record of the testimony given by the witness.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 19th day of September, 2007.



JANE FAUROT, RPR
Chief, Hearing Reporter Services
Office of Commission Clerk
(850) 413-6732

Hearing Exhibit - 000296

PEF PROJECTS CONSIDERED FOR AIS EVALUATION (2007-2009) BUT NOT EVALUATED

Storm Surge:

Small Island north of Coquina Key
Cape San Blast - Barrier Island
Fishbowl - Neighborhood in Crystal River
Arrowhead - Neighborhood in Hernando

Small Wire:

Gulf View Park off of Lake Wales Substation
Lake Reedy Blvd in Frostproof
Tiger Creek Forest

Backlot-to-Frontlot Conversion:

Dominick Estates in Maitland
Feeder M80 in Maitland
Pine Hills Subdivision
Bellair
Beverly Hills

OH-2-UG Conversion:

Windemere
Saddlebag Resort - (to covert back to OH)
Gulf Blvd
Island Estates in Tampa Bay

Miscellaneous Projects Not Meeting AIS Project Criteria

Water Pump for FPL's plant near Turner Substation
25 mile Radial in Bithlo serving TV towers
North Section of International Drive

(Dollars in Millions)

Wooden Pole Inspections

	2004	2005	2006	2007	2008	2009
Revenue Requirement	$ 0.352	$ 0.155	$ 2.305	$ 2.495	$ 2.495	$ 2.495

Tan Storm Hardening Initiatives

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	$ 32.657	$ 38.775	$ 45.509	$ 52.674

Pilot Projects Involving the NESC Extreme Wind Load Standards

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	N/A	$ 0.052	$ 0.190	$ 0.360

New and Pilot Projects Involving Mitigating Flood & Storm Surge Damage to Underground and Supporting Overhead Facilities

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	N/A	$ 0.037	$ 0.096	$ 0.159

New and Pilot Projects Involving Placement of New and Replacement Distribution Facilities to Facilitate Safe & Efficient Access for Installation & Maintenance

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	N/A	$ 0.015	$ 0.064	$ 0.128

Other Distribution Hardening Activities

	2004	2005	2006	2007	2008	2009
Revenue Requirement	N/A	N/A	$ 1.438	$ 4.064	$ 5.287	$ 6.509

Progress Energy Florida Storm Hardening Costs

Description	2006	2007	2008	2009
Vegetation Management (Distribution & Transmission)	$24,235,263	$24,949,339	$24,949,339	$24,949,339
Joint Use Pole Inspection Audit	$1,100,000	$470,000	$484,000	$498,623
Transmission Pole Inspections	$3,526,899	$2,996,257	$3,071,163	$3,147,942
Other Transmission Inspections and Maintenance	$12,121,889	$11,502,308	$11,789,866	$12,084,613
Transmission Hardening Projects	$43,300,000	$38,000,000	$45,000,000	$45,000,000
Distribution Pole Inspections	$2,300,000	$2,490,000	$2,490,000	$2,490,000
Distribution Hardening Projects	$10,200,000	$10,610,000	$10,875,250	$11,147,131
Total	**$96,784,051**	**$91,017,904**	**$98,659,618**	**$99,317,648**

Note: 2007 costs include some estimated/projected costs.
2008 and 2009 costs are all estimated/projected costs.

Late-filed Exhibit 3
PEF's 2007 – 2009 Storm Hardening Costs
Deposition of Jason Cutliffe
Page 1 of 1

Progress Energy Florida Storm Hardening Costs

Description	2006	2007	2008	2009
Vegetation Management (Distribution & Transmission)	$24,235,263	$24,949,339	$24,949,339	$24,949,339
Joint Use Pole Inspection Audit	$1,100,000	$470,000	$484,000	$498,623
Transmission Pole Inspections	$3,526,899	$2,996,257	$3,071,163	$3,147,942
Other Transmission Inspections and Maintenance	$12,121,889	$11,502,308	$11,789,866	$12,084,613
Transmission Hardening Projects	$43,300,000	$38,000,000	$45,000,000	$45,000,000
Distribution Pole Inspections	$2,300,000	$2,490,000	$2,490,000	$2,490,000
Distribution Hardening Projects	$10,200,000	$10,610,000	$10,875,250	$11,147,131
Total	**$96,784,051**	**$91,017,904**	**$98,659,618**	**$99,317,648**
Residential Average Rate Impact (cents/kwh)	**0.115**	**0.130**	**0.144**	**0.159**

Note: 2007 costs include some estimated/projected costs.
2008 and 2009 costs are all estimated/projected costs.

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EXHIBIT NO. _____

DOCKET NO: 070299-EI – GULF POWER COMPANY

WITNESS: VARIOUS

DESCRIPTION: STAFF'S COMPOSITE EXHIBITS - 4

DOCUMENTS:

1) Gulf's Response to Staff's First Set of Interrogatories (Nos. 1-47)
2) Gulf's Response to Staff's Second Set of Interrogatories (Nos. 48-53)
3) Deposition Transcript of Alan G. McDaniel (including errata sheet)
4) Deposition Transcript of Edward J. Battaglia (including errata sheet)
5) Late-Filed Deposition Exhibit No. 1 to the Deposition of Edward J. Battaglia

PROFFERED BY: STAFF

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI **EXHIBIT** 4
COMPANY FL PSC Staff
WITNESS Staff's Composite Exhibits-4
DATE 10/23/07 Stipulated

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company.	)	Docket No.: **070299-EI** Date Filed: August 15, 2007

GULF POWER COMPANY'S RESPONSES TO
STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1-47)

GULF POWER COMPANY ("Gulf Power", "Gulf", or "the Company"), by and through its undersigned counsel, hereby submits the Company's responses to Staff's First Set of Interrogatories (Nos. 1-47) on the following pages.

Respectfully submitted the 15TH day of August, 2007,

JEFFREY A. STONE
Florida Bar No. 325953
RUSSELL A. BADDERS
Florida Bar No. 007455
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Attorneys for Gulf Power Company

AUG 16 2007

Compliance with National Electric Safety Code (NESC)

1. In its Plan, Gulf asserts that its construction standards meet or exceed the National Electrical Safety Code (NESC). How has Gulf verified that, at a minimum, it has complied with the 2007 NESC?

ANSWER:

Distribution

Gulf verifies its code compliance through its material and design specification development process. This process is done by a Southern Company Engineer Team whose members are from each of the operating companies. As material and design specifications are updated or changed; they are then subjected to a rigorous review and approval process by the operating companies.

In order for Gulf to remain in compliance with the NESC and generally accepted engineering practices, pre-notification of any intent to attach or do overlashing of a main line cable by an ILEC, CLEC, CATV, or other third Party attaching entity is a necessity. Absent such notice Gulf Power Company cannot assert that its poles and facilities are in compliance. Through a combination of joint use audits, inspections, and field surveys of attachments post inspections are performed that help ensure compliance with the NESC.

Transmission

The design criteria used by Gulf Power were developed utilizing the criteria set forth in the 2007 National Electric Safety Code. The standards are prepared by Professional Engineers at Southern Company Transmission, of which Gulf Power is a part, in accordance with the rigors of the profession.

Extreme Wind Loading Standards (EWL)

2. Please provide a list of each proposed change to Gulf's current construction standards, policies, practices and procedures contained in its Storm Hardening Plan.

ANSWER:

Distribution

Gulf's proposed changes are listed below. All changes, except for adopting Grade B construction, are contained within Appendix 2, 4, and 5 of Gulf's amended Storm Hardening Plan. A summary of these changes is below:

- Adopt Grade B construction for all construction.
- Pre-notification of Overlashing by Third Party Attachers. The changes to Gulf's third party attachment standards and procedures are limited to two areas: (1) Pole Strength and Loading engineering assessments for all new burdens on the pole; and (2) Overlashing notification requirement to enable Gulf to perform the strength and loading analysis prior to overlashing.
- Targeted application of the extreme wind loading standards on critical infrastructure facilities and to Interstate road crossings.
- Expanded use of "Storm Guying" for equipment poles.
- Use of pole bracing to strengthen existing poles.
- Transformer installation design change which minimizes the possibility of damage to the transformer in the event of a tree impact on a service.

Transmission

Gulf Power's transmission facilities are currently designed to meet or exceed the applicable version of the NESC under which the line was built. This design includes NESC Extreme Wind loading as one of the criteria. No changes were necessary to the existing design standards.

3. For each proposed change listed in response to Interrogatory No. 2, please state the scope the of each proposed change, the estimated cost of each change, the corresponding effect of reduced storm restoration costs and outage times, and the methodology of how cost-effectiveness is determined.

ANSWER:

Distribution

Proposed Changes	Estimated Incremental Cost based on Total Three Year Plan	Avoided Storm Restoration Costs	Avoided Outage Time	Methodology Used
Adopt Grade B construction for all construction	$506,300	$1,122,132	66,621	Note 1
Pre-notification of OverLashing by Third Party Attachers	N.S.A.C.	Note 2	Note 2	Note 2
Applying Extreme Wind Loading to targeted projects	$1,586,318	$271,180	23,095	Note 1
Expanded use of "Storm Guying" for equipment poles. (Please see Appendix 5 of Gulf's Storm Hardening Plan.	N.S.A.C.	Note 3	Note 3	Note 3
Use of pole bracing to strengthen existing poles.	N.S.A.C.	Note 3	Note 3	Note 3
Transformer installation design change which minimizes the possibility of damage to the transformer in the event of a tree impact on a service.	N.S.A.C.	Note 3	Note 3	Note 3

Note 1 - Insert calculation methodology provided in previous interrogatories.

Note 2 - Pre-notification of overlashing is essential for success of Grade B or C construction to attain avoided cost and avoided outage savings.

Note 3 - It is not possible to estimate benefits at this time.

N.A.C. = No Additional Cost
N.S.A.C. = No Significant Additional Cost

Transmission

There are no changes proposed for Transmission facilities.

4. What percentage of Gulf's total distribution system on a mile basis is considered critical infrastructure?

ANSWER:

Percentage = 13.86%

Critical Infrastructure as defined by Gulf is composed of hospitals, major sewage treatment plants, and fuel depots. Gulf utilized its Distribution Geographic Information System to obtain all data used in this calculation. In this calculation, the main line miles of critical infrastructure is divided by the total main line miles for all company feeders.

5. What percentage of Gulf's total distribution system on a plant-in-service basis is considered critical infrastructure?

ANSWER:

Gulf utilized its Distribution Geographic Information System to obtain all data used in this calculation and defined "plant-in-service" as wire, poles, transformers and all pole mounted devices. Since the plant-in-service definition includes wire, wire can only be calculated on a distance basis and will therefore be the same percentage as in the response to Interrogatory No. 4.

For all of the rest of the plant-in-service, the percentage is 13.58%.

6. What percentage of Gulf's total critical infrastructure on a mile basis requires storm hardening?

ANSWER:

Gulf feels it is prudent to move cautiously into the application of the extreme wind loading standards until it is able to determine the true cost and outage benefits. Since Gulf lacks the empirical data to support the benefits associated with applying extreme wind loading standards to distribution poles, it was decided to focus first on critical infrastructure facilities within one mile of the Gulf of Mexico or a major bay. As storm forensic data is gathered to help determine the benefits and effectiveness of the targeted storm hardening initiatives, Gulf will review its plan. Gulf will continue to look at new information as it becomes available from the industry, PURC and Gulf's daily operations.

Given the above, the percentage of Gulf's total critical infrastructure on a mile basis which requires storm hardening is shown below. Gulf used its Distribution Geographic Information System to obtain all data used in this calculation.

Percentage = 42.72%

7. What percentage of Gulf's total critical infrastructure on a plant-in-service basis requires storm hardening?

ANSWER:

Gulf feels it is prudent to move cautiously into the application of the extreme wind loading standards until it is able to determine the true cost and outage benefits. Since Gulf lacks the empirical data to support the benefits associated with applying extreme wind loading standards to distribution poles, it was decided to focus first on critical infrastructure facilities within one mile of the Gulf of Mexico or a major bay. As storm forensic data is gathered to help determine the benefits and effectiveness of the targeted storm hardening initiatives, Gulf will review its plan. Gulf will continue to look at new information as it becomes available from the industry, PURC and Gulf's daily operations.

Given the above, the percentage of Gulf's total critical infrastructure on a plant-in-service basis which requires storm hardening is shown below. Gulf used its Distribution Geographic Information System to obtain all data used in this calculation.

Gulf defined "plant-in-service" as wire, poles, transformers and all pole mounted devices. Since the plant-in-service definition includes wire, wire can only be calculated on a distance basis, and will therefore be the same percentage as in the response to Interrogatory No. 6.

For all of the rest of the plant-in-service, the percentage is 38.32%

8. What percentage of Gulf's total critical infrastructure on a mile basis will be hardened each year during the 2007-2009 time frame?

ANSWER:

Gulf utilized its Distribution Geographic Information System to obtain all data used in these calculations.

Year	Targeted Critical Infrastructure Miles	Percentage of Gulf's total critical infrastructure on a mile basis to be hardened
2007	3.38	2.9%
2008	3.96	3.4%
2009	3.49	3.0%

9. What percentage of Gulf's total critical infrastructure on a plant-in-services basis will be hardened each year during the 2007-2009 time frame?

ANSWER:

Gulf utilized its Distribution Geographic Information System to obtain all data used in these calculations.

Year	Targeted Critical Infrastructure Plant-In-Services	Percentage of Gulf's total critical infrastructure on a plant-in-services basis will be hardened
2007	82	2.5%
2008	106	3.3%
2009	67	2.1%

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards

10. Please provide a list of each proposed change to Gulf's current construction standards, policies, practices and procedures contained in its Gulf 's Storm Hardening Plan.

ANSWER:

Distribution

Gulf's proposed changes are contained within Appendix 6 of Gulf's amended Storm Hardening Plan. A summary of these changes are below:

- Increased mounting height of equipment controls to avoid flooding.
- Use of pole foam to strengthen pole bases to lessen leaning after flooding.
- Increased mounting height of customer meters to avoid flooding.
- Encase underground feeders, utilizing a duct system, in concrete.
- Use natural barriers, such a dunes and elevated terrain areas, along with buildings to provide storm surge protection for padmounted equipment.
- Use of concrete pilings to anchor vaults.

11. For each change identified in Interrogatory No. 10, please state the scope of each change, the cost of each change, the corresponding effect of reducing storm restoration costs and outage times, and how cost-effectiveness is determined.

ANSWER:

Proposed Changes	Estimated Incremental Cost based on Total Three Year Plan	Avoided Storm Restoration Costs	Avoided Outage Time	Methodology Used
Increased mounting height of equipment controls to avoid flooding.	N.A.C.	Note 2	Note 2	Note 2
Use of pole foam to strengthen pole bases to lessen leaning after flooding.	N.S.A.C.	Note 2	Note 2	Note 2
Increased mounting height of customer meters to avoid flooding.	Note 1	Note 2	Note 2	Note 2
Use of flush-mount stainless-steel switchgear, concrete vaults and lids, and pilings to anchor vaults. Use a concrete-encased duct system with underground feeders.	$381,000	Note 2	Note 2	Note 2
Use natural barriers, such a dunes and elevated terrain areas, along with buildings to provide storm surge protection for padmounted equipment.	N.A.C.	Note 2	Note 2	Note 2

Note 1 - Total Cost will vary depending upon load growth and rebuilds. Also, for each installation, Company and customer cost will vary depending upon the specifics of the installation.

Note 2 - Gulf recognized and piloted underground system storm hardening design changes in response to lessons learned from Ivan in 2004. Experience with recent storms indicate that undergrounding in coastal areas will likely have little or no benefit from a storm hardening prospective. Until benefits can be identified through the pilot programs, a methodology for determining the value of the potential benefits of undergrounding in coastal areas as a storm hardening technique cannot be developed.

N.A.C. = No Additional Cost
N.S.A.C. = No Significant Additional Cost

Subject Matter: Areas Prone to Flooding and Storm Surge.

12. During the 2004 and 2005 hurricane seasons, what percent of Gulf's underground facilities located in Category 1-3 storm surge areas experienced flooding or storm surge damage?

ANSWER:

Gulf did not perform forensic data gathering after the storms experienced in 2004 and 2005. Sections 2.6 and 2.7 of Gulf's Storm Hardening Plan describe future mechanisms for collecting needed data after storms.

13. Please provide a detailed list of the underground facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damage during the 2004 and 2005 hurricane seasons.

ANSWER:

Gulf did not perform forensic data gathering after the storms experienced in 2004 and 2005. Sections 2.6 and 2.7 of Gulf's Storm Hardening Plan describe future mechanisms for collecting needed data after storms.

14. During the 2004 and 2005 hurricane seasons, what percent of Gulf's overhead facilities located in Category 1-3 storm surge areas experienced extreme wind or wind debris damage?

ANSWER:

Gulf did not perform forensic data gathering after the storms experienced in 2004 and 2005. Sections 2.6 and 2.7 of Gulf's Storm Hardening Plan describe future mechanisms for collecting needed data after storms.

15. Please provide a detailed list of overhead facilities located in Category 1-3 storm surge areas that experienced extreme wind or wind debris during the 2004 and 2005 hurricane seasons.

ANSWER:

Gulf did not perform forensic data gathering after the storms experienced in 2004 and 2005. Sections 2.6 and 2.7 of Gulf's Storm Hardening Plan describe future mechanisms for collecting needed data after storms.

16. Has Gulf concluded that underground distribution facilities are less susceptible to storm damage than overhead distribution facilities for coastal areas of its service territory?

A. What is the basis for that conclusion?

ANSWER:

No.

A. This conclusion is based on Gulf's operational and storm restoration experience. Gulf experienced significant to extreme damage to its underground facilities in coastal areas from both Hurricane Ivan and Dennis. In years past, other hurricanes have caused similar damage. Storm surge and flooding is the major driver of this damage. Gulf is piloting underground system storm hardening design changes in response to lessons learned from Hurricane Ivan in 2004. It is not known at this time whether these changes will have a positive impact on storm restoration.

Although Gulf did not perform forensic data gathering after the storms experienced in 2004 and 2005, the attached presentation does illustrate the catastrophic effects wind, debris, and storm surge flooding had on Gulf Power Company's underground distribution system.

See attached slides for support of this conclusion.

Gulf Power Company
Storm Hardening Plan

FPSC IROG 16

Underground Distribution

August 15, 1007

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"What is the largest known outbreak of tornadoes"

2004's Hurricane Ivan caused a multi-day outbreak of 127 tornadoes with Florida experiencing 22.

This piece of data helps support that, without a doubt, Ivan in 2004, was a benchmark storm in relation to level of storm destruction experienced by Gulf Power Company

Subject : L7) What is the largest known outbreak of TC tornadoes?

Contributed by Bill McCaul, Chris Vaccaro and the National Hurricane Center

2004's Hurricane Ivan caused a multi-day outbreak of 127 tornadoes, with the bulk of the tornadoes on 17 September in the mid-Atlantic region, some two days after Ivan's landfall in Alabama. State-by-state tornado counts from Ivan include Florida with 22, Georgia 25, Alabama 8, South Carolina 7, North Carolina 4, Virginia 40, West Virginia 3, Maryland 9, and Pennsylvania 9. There were 26 tornadoes on 15 September, 32 on 16 September, 63 on 17 September, 2 on 18 September, and 4 on 19 September. At least 7 people were killed and 17 injured by these tornadoes.

The previous record was during Hurricane Beulah, which spawned a reported 115 tornadoes in southeast Texas during the first several days after its landfall in September 1967 (Orton 1970). Frances of 2004 is close behind in third place, with 106 tornadoes, and Rita of 2005 is in fourth place with 92. For a list of the top 25 tornado producing TCs, see the website:

http://www.tornadoproject.com/alltorns/tcyclone2.htm

While it is difficult to predict which TCs will produce large tornado outbreaks, there is evidence suggesting that the likelihood of a major outbreak increases for TCs that are large, intense, are recurving and entering the westerlies, have forward speeds from about 8-18 mph, and are interacting with old, weakened frontal boundaries. In addition, the TC's right-front quadrant must receive significant exposure to land, and this strongly favors TCs making landfall on the Gulf coast as opposed to those grazing the Carolinas (McCaul, 1991; McCaul et al., 2004).

Last updated October 4, 2006

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Underground and Under sand

Hearing Exhibit - 000323

2004 – 2005 Hurricane Season
What We Experienced

- Damage to our system by
  - Wind
  - Storm Surge
  - Trees
  - Debris
  - Debris Removers
  - Customers

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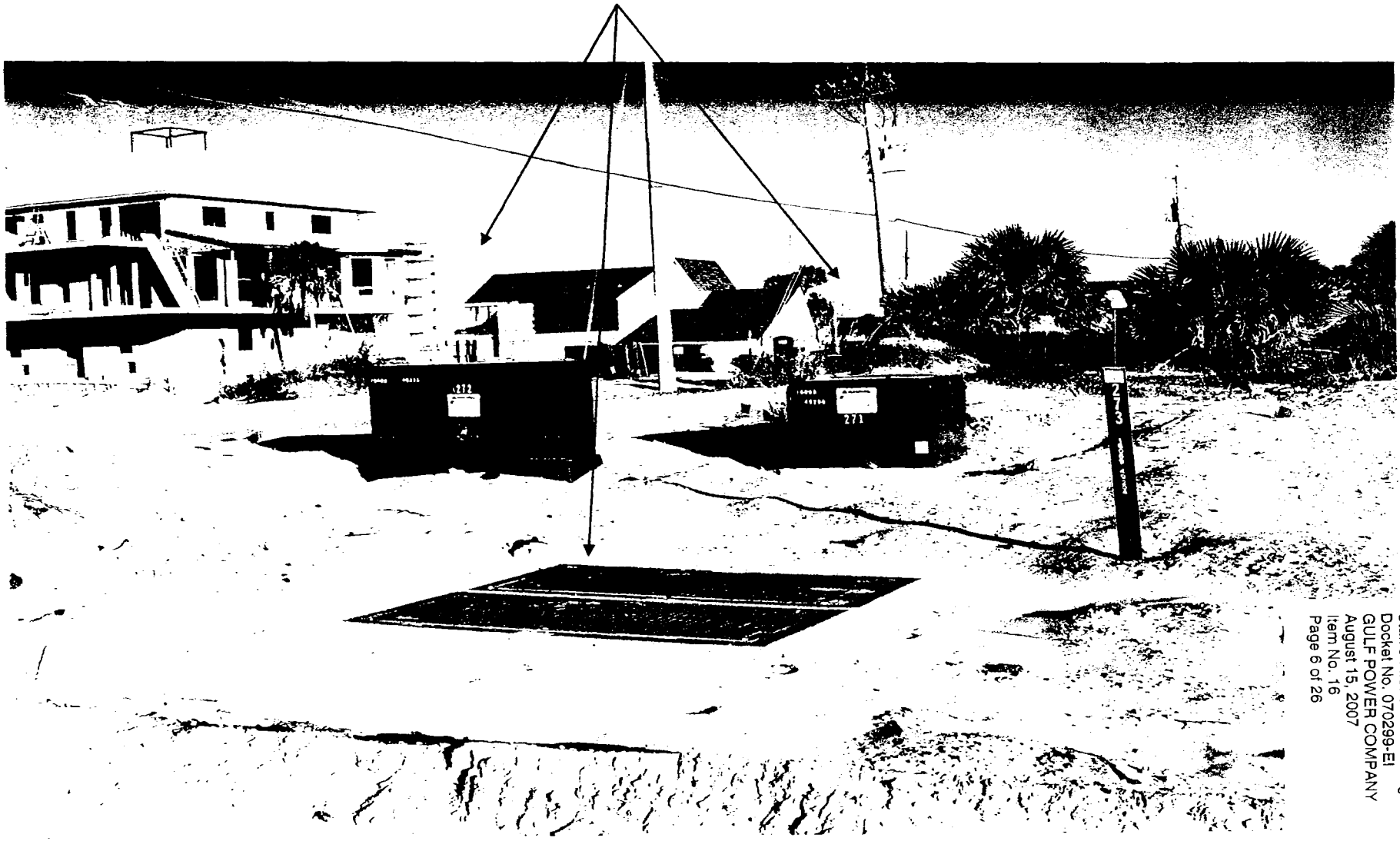
Hearing Exhibit - 000324

PAD MOUNTED EQUIPMENT MAY NOT SURVIVE AS WELL AS FLUSH MOUNTED EQUIPMENT IN STORM SURGE



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Hearing Exhibit - 000326

Post Ivan: Lessons Learned and applied beginning in 2005

- Circuits are placed in concrete duct bank below existing grade
- Natural topography such as sand dunes and higher elevations are used as added protection against storm surge for critical gear
- Cathodic protection was installed on all submersible switchgear

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Hearing Exhibit - 000327

Post Ivan: Lessons Learned and applied beginning in 2005 (continued)

- 10' Concrete pilings were constructed as a test to help prevent shear force of storm surge to keep equipment in place (new approaches)
- All main switches are installed in flush–mounted heavy concrete enclosures
- A flush-mounted concrete 3-phase switching enclosure was constructed as a test case on a tap

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Hearing Exhibit - 000328

Destroyed Underground Switching Cabinet

Pilot Project Items

- Below Grade Gear
- Heavy Lids
- Vaults
- Anchoring system

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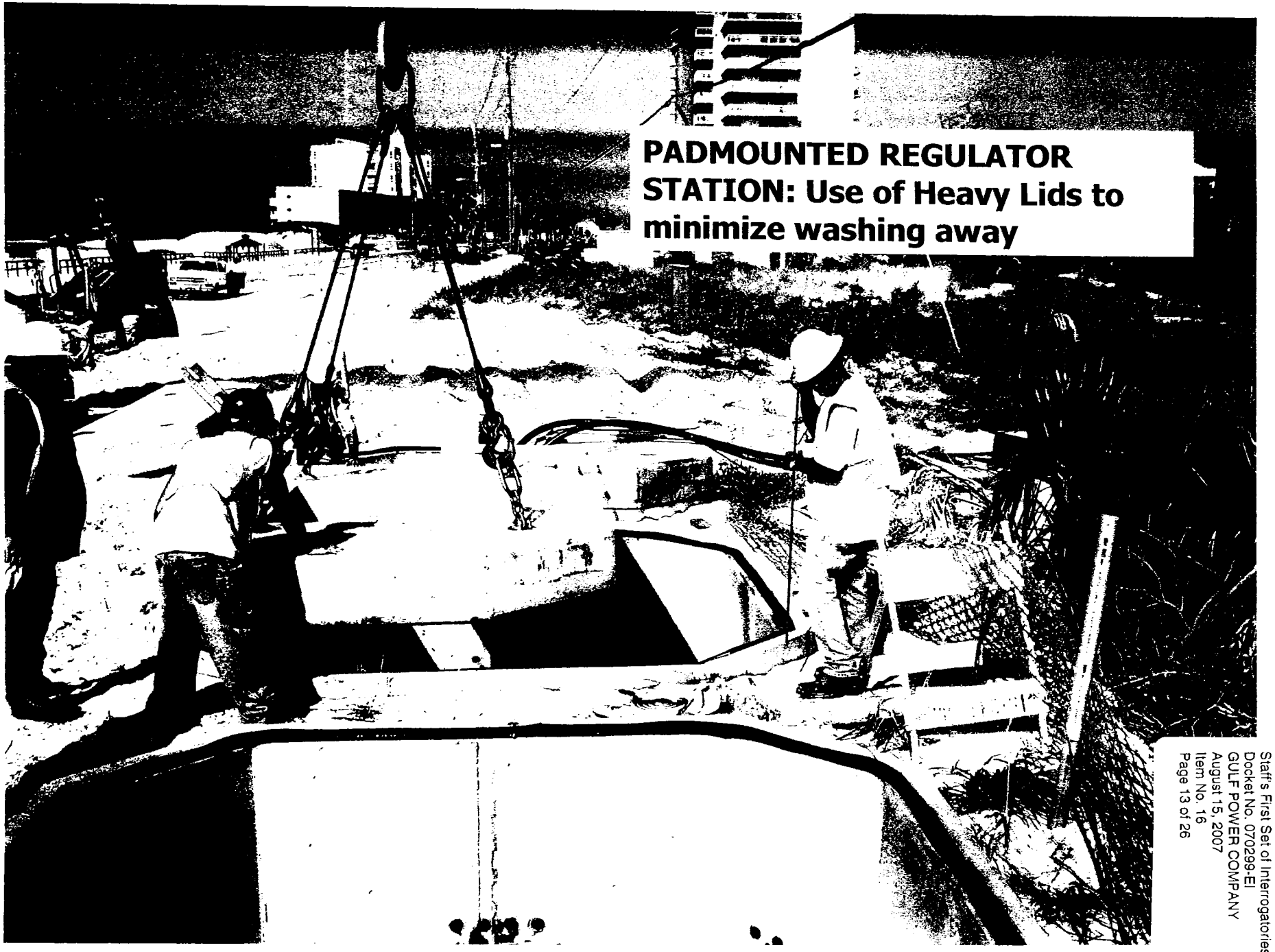
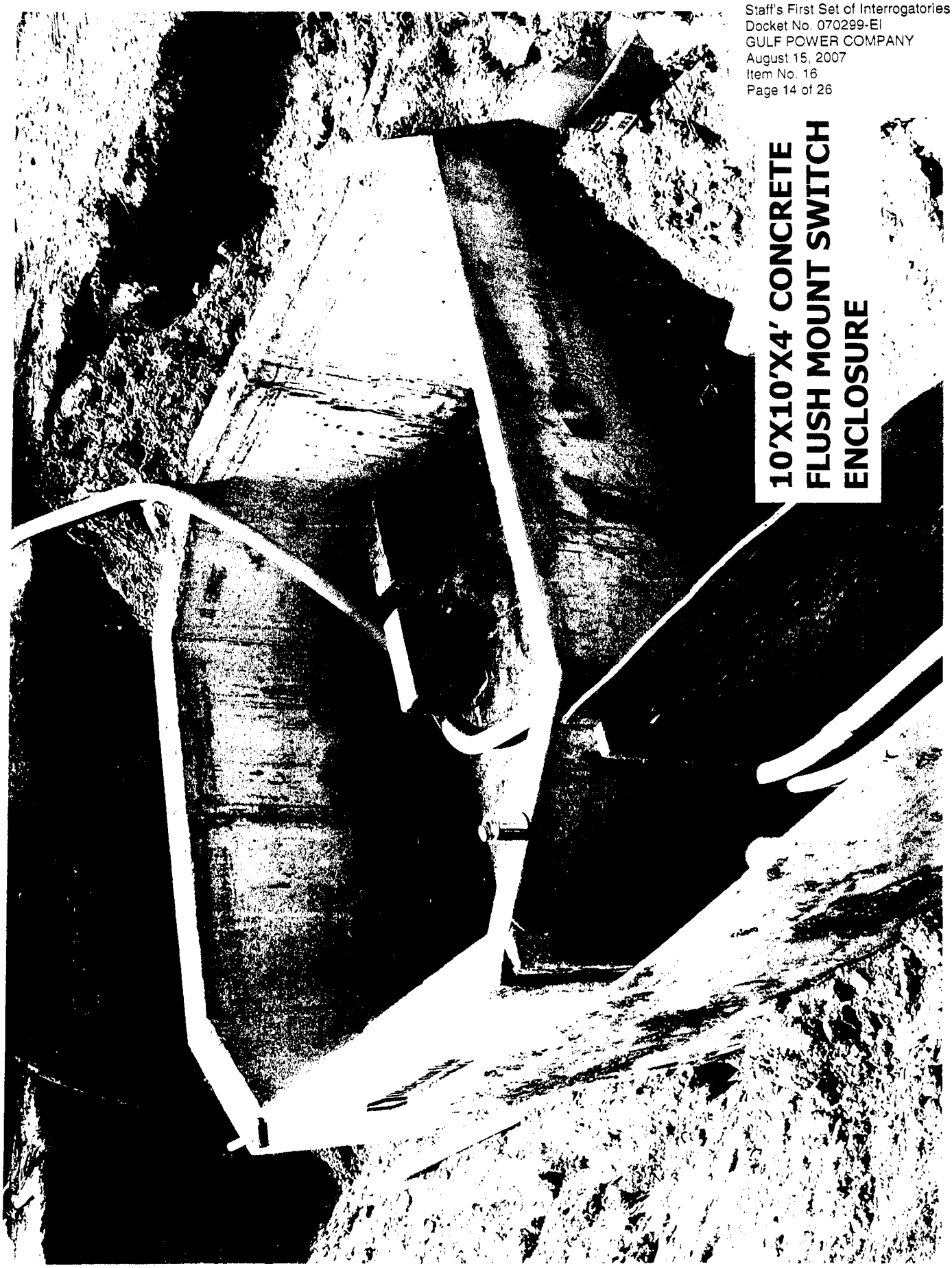
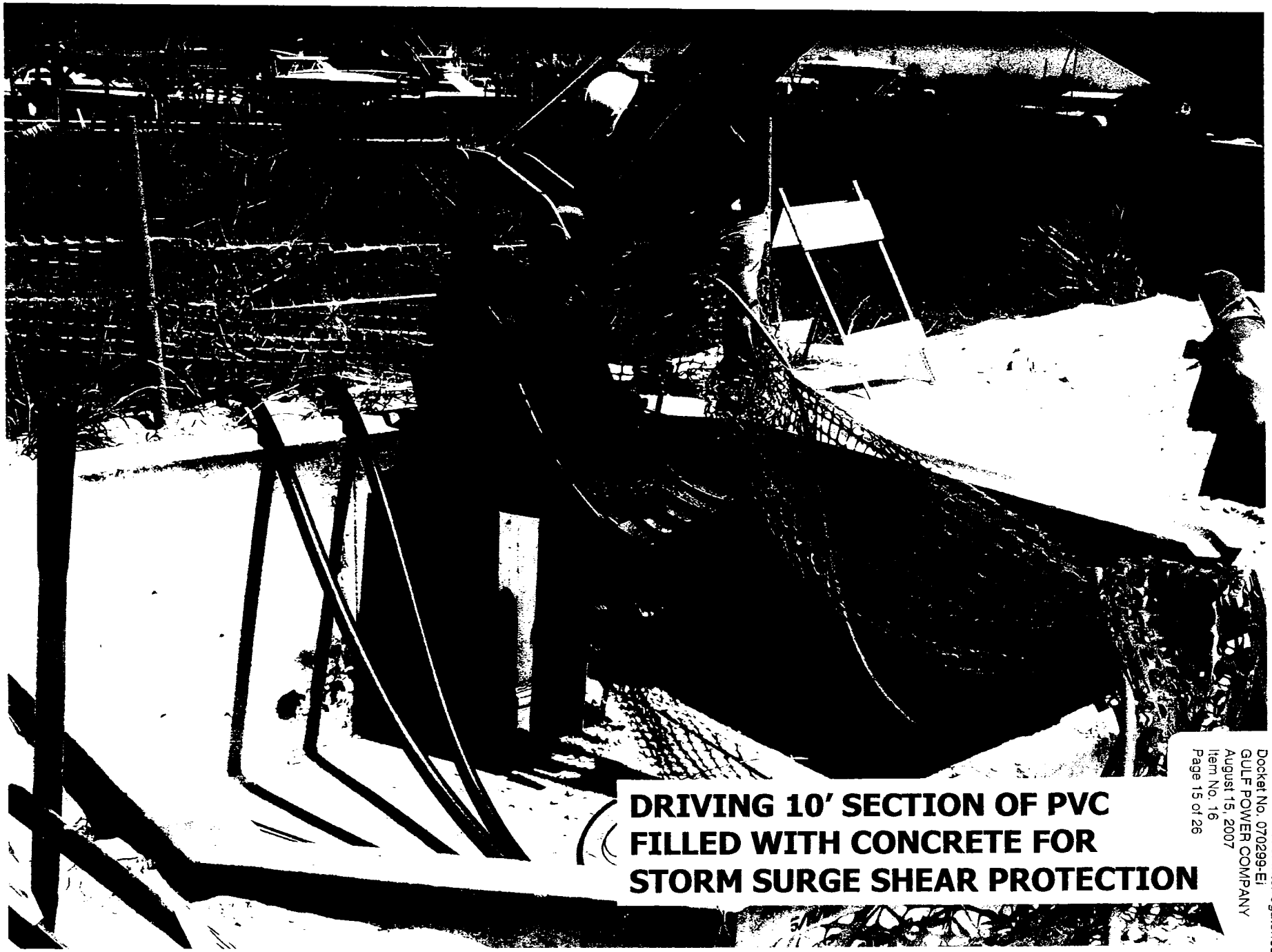
Hearing Exhibit - 000330

Flush mounted Vista Switch gear

Hearing Exhibit - 000331


PADMOUNTED REGULATOR STATION: Use of Heavy Lids to minimize washing away


10'X10'X4' CONCRETE
FLUSH MOUNT SWITCH
ENCLOSURE



DRIVING 10' SECTION OF PVC FILLED WITH CONCRETE FOR STORM SURGE SHEAR PROTECTION

Summary on Underground

- Experience: Hurricanes Opal, Ivan and Dennis showed beach areas are extremely susceptible to washouts and damage depending on local contours and elevations - Lessons learned
- Expectations: Storm surge will pass over flush mounted equipment and duct bank reducing restoration time. Regulators, capacitors, transformers, secondary and service pedestals still susceptible to storm surge and debris damage

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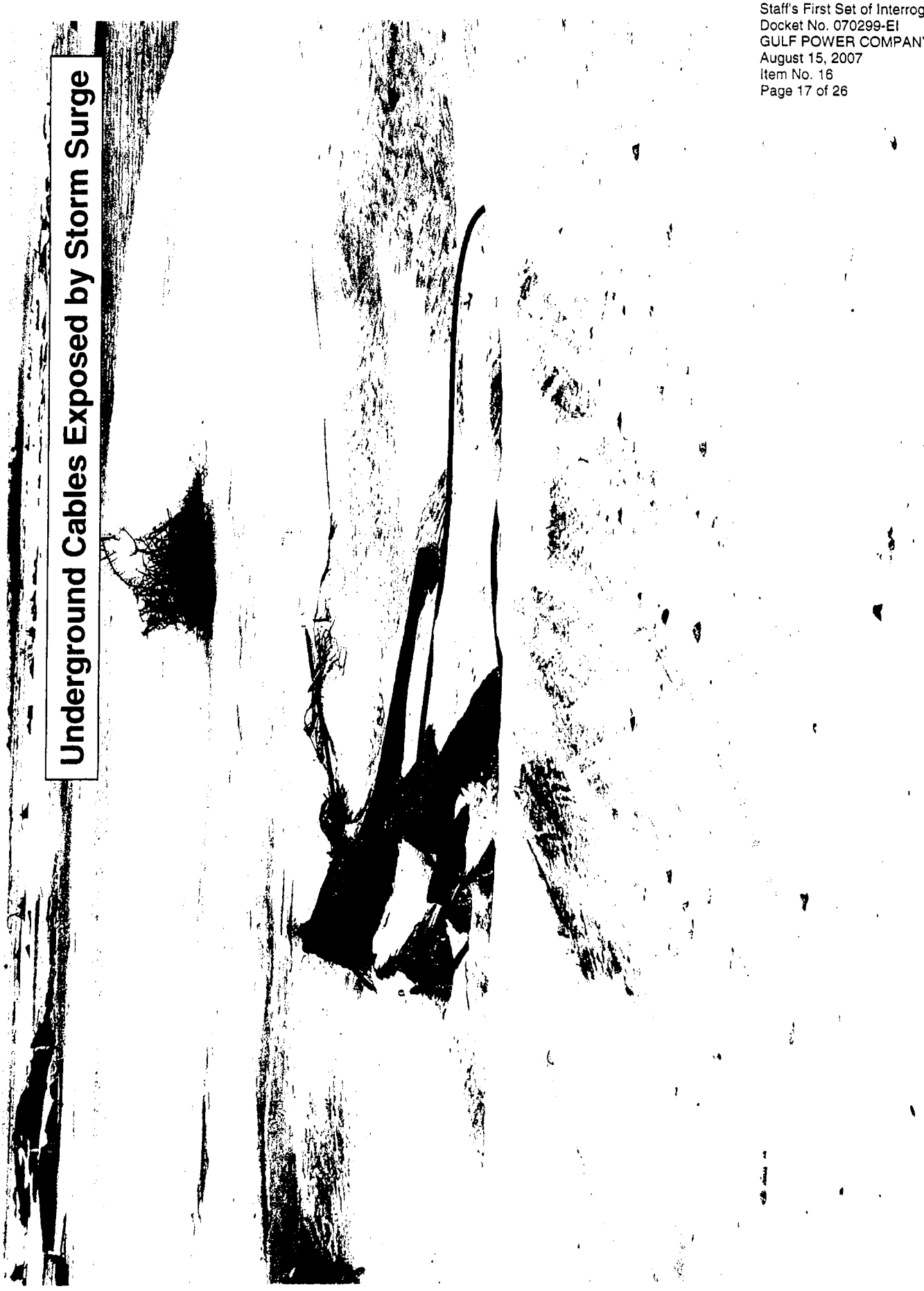
Hearing Exhibit - 000335


Underground Cables Exposed by Storm Surge

Road Destroyed on Barrier Island

HURRICANE OPAL 1995

- **There was a cul-de-sac here; now it's a canal. Our equipment is underwater.**

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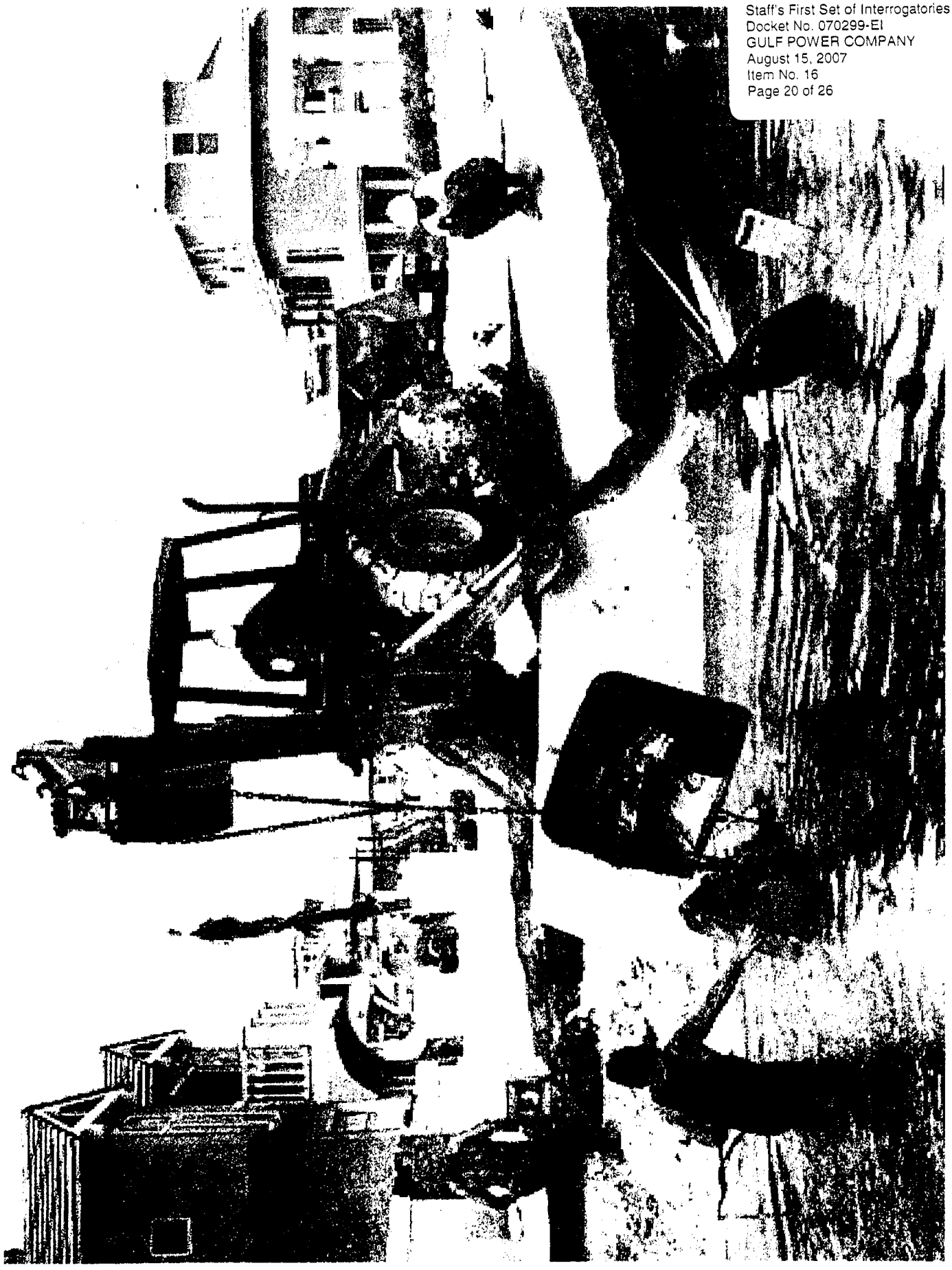

Customer Debris Hampers Restoration Efforts

Erosion around Padmount Switchgear

Damaged and destroyed meters removed from various beach locations.

UG Storm Hardening TOTALS

Year	Total Cost	**Incremental Costs above what** Gulf would have spent
2005	$230,770	$71,680
2006	$1,695,400	$446,000
2007	$742,600	$181,000
Totals:	$2,668,770	$698,680

Hearing Exhibit - 000343

Conclusion

- Gulf has not determined a methodology at this time for the benefits of undergrounding in coastal areas as a storm hardening technique.

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Hearing Exhibit - 000344

Summary

- Gulf Power Company continues to be proactive and innovative developing solutions for storm hardening, while working with our customers to achieve their goals
- PURC, industry research, and forensic data gathering will be used to evaluate and improve the system.

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Hearing Exhibit - 000345

17. Please identify all storm hardening projects located in areas Gulf believes are prone to storm surge and flooding.

ANSWER:

At this time, Gulf can only list the targeted critical infrastructure projects identified in its amended Storm Hardening Plan. Applicable projects impacted by adopting Grade B construction are unknown at this time. Based on a Category 3 storm, the following projects would be prone to storm surge and flooding.

2007	District	Critical Load	Feeder ID	Total Main Miles
	Western	Sewage Plant	5912	0.37
	Western	Sewage Plant	7402	1.36
	Western	Fuel Depot	6522	1.38
2008	**District**	**Critical Load**	**Feeder ID**	**Total Main Miles**
	Central	Fuel Depot	9252	2.83
2009	**District**	**Critical Load**	**Feeder ID**	**Total Main Miles**
		N.A.		
		N.A.		

The following are applicable pilot underground conversion projects.

Storm Surge/Flooding:

1. Ft. Pickens Road, Pensacola Beach, (Concrete duct bank, flush mounted main switchgear) 13,200 ft. Feeder # 7532 and Feeder # 7542

2. Laird Point, Panama City, (flush mounted main switchgear) Area prone to storm surge, flush mounted submersible switchgear used (new subdivision) Feeder # 8332

18. Please identify all critical infrastructure sites located in areas Gulf believes are prone to storm surge and flooding.

ANSWER:

Based on a Category 3 storm, the following projects would be prone to storm surge and flooding. The sites which are "highlighted" in yellow are contained in the 2007-2009 plan.

District	Critical Infrastructure	Feeder
Central	Russell Stephenson Water Treatment Facility	5892
Central	Citgo Fuel Depot	9252
Eastern	Chevron Fuel Depot	9934
Eastern	Lynn Haven Treatment Plant	8852
Eastern	Millville Waste Water Treatment	8722
Western	Navarre Beach Sewage Plant	5632
Western	Main Street Sewage Plant	5912
Western	Trans Montaigne Fuel Depot	6522
Western	Main Street Sewage Plant	7402

19. How has Gulf mitigated flood and storm surge damage to underground distribution facilities when developers, communities, governmental agencies, or homeowners request underground distribution facilities in the Company's flood and storm surge prone areas?

ANSWER:

In an effort to find practices that may mitigate flood and storm damage to underground distribution, Gulf Power Company has taken lessons learned from previous storms and on a pilot basis is trying them in coastal areas. The strategies deployed include below grade stainless steel switchgear, cathode protection, concrete encased duct banks, concrete vaults, heavy lids, and piling-anchoring systems.

Subject matter: Plan Appendices 5 and 6

20. How does Gulf's Appendix 5, Overhead Storm Hardening Specifications, and Appendix 6, Underground Storm Hardening Specifications, minimize flood and storm surge damage to distribution facilities?

ANSWER:

The items from these appendices relevant to minimizing flood and storm surge damage along with a short description of how, are listed below.

- Increased mounting height of equipment controls to avoid flooding.
- Use of pole foam to strengthen pole bases to lessen leaning after flooding.
- Increased mounting height of customer meters to avoid flooding.
- Encase underground feeders, utilizing a duct system, in concrete.
- Use natural barriers, such a dunes and elevated terrain areas, along with buildings to provide storm surge protection for padmounted equipment.
- Use of concrete pilings to anchor vaults.

21. Please provide incremental costs, change in storm restoration costs, and change in customer outages due to appendices 5 and 6, respectively.

ANSWER:

See responses to Interrogatories Nos. 3 and 11.

Placement of New and Replacement Distribution Facilities to Facilitate Safe and Efficient Access

Subject Matter: Incremental Changes to Standards for Placement of New and Replacement Distribution Facilities.

22. Please provide a list of changes to Gulf's current construction standards, polices, practices, and procedures contained in the company's Storm Hardening Plan.

ANSWER:

No change to company policy was necessary in this area. Gulf does not have a significant number of its facilities installed on rear lot lines. Gulf Power has always recognized that accessibility to distribution facilities is essential to safe and efficient maintenance and storm restoration. Therefore, Gulf continues to strive to promote placement of facilities adjacent to public roads; to use easements, public streets, roads and highways; obtain easements for underground facilities; and to use road right-of-ways for conversions of overhead to underground. Gulf reinforces this policy by including it on specification plate A-OZZ-2 in Appendix 5 and specification plate A-UZZ-1 in Appendix 6 of Gulf's amended Storm Hardening Plan.

23. For each change identified in response to Interrogatory No. 22, please state the scope of each change, the cost of each change, the corresponding effect of reducing storm restoration costs and outage times, and how cost-effectiveness is determined.

ANSWER:

Not applicable.

24. Please describe Gulf's current policy regarding placement of new and replacement facilities, and identify where that policy is described in Gulf's Storm Hardening Plan.

ANSWER:

Gulf does not have a significant number of its facilities installed on rear lot lines. Gulf Power has always recognized that accessibility to distribution facilities is essential to safe and efficient maintenance and storm restoration. Therefore, Gulf continues to strive to promote placement of facilities adjacent to public roads; to use easements, public streets, roads and highways; obtain easements for underground facilities; and to use road right-of-ways for conversions of overhead to underground. No change to company policies was necessary in this area. Gulf reinforces this policy by including it on specification plate A-OZZ-2 in Appendix 5 and specification plate A-UZZ-1 in Appendix 6 of Gulf's Amended Storm Hardening Plan.

Description of Facilities Affected

25. Please provide a list of each geographic site where Gulf plans to implement storm hardening activities during the years 2007 through 2009.

A. For each site identified in response to Interrogatory No. 25, state the scope of storm hardening activity, estimated investment costs, estimated operational expenses, estimated storm restoration costs savings, estimated reduction in storm caused outages, and criteria used to select the site for storm hardening.

ANSWER:

A. Please see Appendix 1 of Gulf's Amended Storm Hardening Plan which illustrates the geographic sites. Projects impacted by adopting Grade B construction are unknown at this time. Proposed projects are shown in the table below.

2007	District	Critical Load	Feeder ID	Total Main Miles	Estimated Total Cost	Est Capital Cost	Est O&M Cost	Est Storm Restoration Cost Savings	Est Reduction in Storm Caused Outages	Criteria Used To Select the Site
	Central	Hospital	8162	0.27	$34,038	$20,423	$13,615	$16,077	1,386	Note 1
	Eastern	I-10 Crossings	Various	N.A.	$52,000	$48,000	$4,000	$28,817	2,541	Note 1
	Central	I-10 Crossings	Various	N.A.	$45,500	$42,000	$3,500	$25,177	2,079	Note 1
	Western	Sewage Plant	5912	0.37	$46,645	$27,987	$18,658	$25,177	2,079	Note 1
	Western	Sewage Plant	7402	1.36	$171,453	$102,872	$68,581	$87,057	7,390	Note 1
	Western	Fuel Depot	6522	1.38	$173,974	$104,385	$69,589	$88,875	7,620	Note 1
2008										
	Central	Hospital	9132	1.13	$142,457	$85,474	$56,983	$73,892	6,293	Note 1
	Central	Fuel Depot	9252	2.83	$356,772	$214,064	$142,708	$180,908	15,407	Note 1
2009										
	Western	Hospital	7512 & 7522	1.06	$133,633	$80,180	$53,453	$67,395	5,740	Note 1
	Central	Sewage Plant	9342	2.43	$306,346	$183,808	$122,538	$155,300	13,226	Note 1
	Western	I-10 Crossings	Various	N.A.	$123,500	$114,000	$9,500	$70,325	5,989	Note 1
	Eastern	FrontBeach Road: UG	Various	5.0	Unknown	See Note 2				

Note 1: Critical Infrastructure sites were selected to ensure Gulf the greatest opportunity for obtaining forensic data.

Note 2: Scope has not been defined by the customer at this time. Cost will be dependent upon the City's desired scope and the project may be done in phases over several years.

Communities and Areas Where Electric Infrastructure Improvements are to be Made

26. Please describe the process Gulf used to determine and schedule which communities receive electric infrastructure improvements.

ANSWER:

Gulf's process used to determine and schedule which communities receive electric infrastructure improvements was strictly based on where the most opportunities may occur to collect forensic data. This is based on the 2004 and 2005 storm experiences.

Gulf feels it is prudent to move cautiously into the application of the extreme wind loading standards until it is able to determine the true cost and outage benefits. Since Gulf lacks the empirical data to support the benefits associated with applying extreme wind loading standards to distribution poles, it was decided to focus first on critical infrastructure facilities within one mile of the Gulf of Mexico and major Bays. As storm forensic data is gathered to help determine the benefits and effectiveness of the targeted storm hardening initiatives, Gulf will review its plan.

Utility's Definition of Critical Infrastructure and Major Thoroughfares

27. What is Gulf's definition of critical infrastructure facilities?

ANSWER:

Gulf defines critical infrastructure facilities as feeders which serve critical loads, such as hospitals, major sewage treatment plants, and fuel depots.

28. What is Gulf's definition of major thoroughfares?

ANSWER:

Gulf defines major thoroughfares as Interstates10 and 110.

29. Please describe the process used by Gulf to coordinate the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, or local communities.

ANSWER:

Appendix 1 of Gulf's Storm Hardening Plan shows the communities within Gulf's service area. As a part of the process of developing Gulf's plan, Gulf solicited a representative sample of input from the County Emergency Operating Centers to help determine the critical infrastructure categories on which to begin focusing its storm hardening efforts. This is the basis of our definition of critical infrastructures. This also served to reinforce Gulf's ongoing input from local governmental as described in Section 2.8 of Gulf's Amended Storm Hardening Plan.

30. Please identify each governmental agencies, companies, municipalities, or local communities, if any, Gulf has coordinated with to determine the selection of critical infrastructure and major thoroughfares.

ANSWER:

Gulf solicited a representative sample of input from the County Emergency Operating Centers for Escambia and Santa Rosa Counties to help determine the critical infrastructure categories on which to begin focusing its storm hardening efforts. This also served to reinforce Gulf's ongoing input from local governmental entities as described in Section 2.8 of Gulf's amended Storm Hardening Plan.

31. If your response to Interrogatory No. 29 is "none," please provide an explanation as to why Gulf has not coordinated the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, or local communities.

ANSWER:

Not applicable.

Estimate of Costs and Benefits to the Electrical Utility

32. Please list Gulf's estimated costs and benefits for each of its storm hardening activities for the years 2007 through 2009.

ANSWER:

Please see Appendix 7 of Gulf's Amended Storm Hardening Plan.

33. Please provide the estimated costs and benefits to Gulf associated with implementing a EWL standard consistent with NESC Figure 250(d).

ANSWER:

If Gulf applied EWL standards to all of its existing distribution overhead lines, the cost would be approximately $437.2 million dollars plus a yearly cost of approximately $2 million dollars associated with new overhead construction. These cost estimates are based on approximately 6,000 miles of overhead system as of end of year 2006.

In Gulf's assessment, the benefits would be no greater than those already provided in Appendix 7 of Gulf's Amended Storm Hardening Plan based on using the 2004 Hurricane Ivan level of damage.

34. Please describe how Gulf's Storm Hardening Plan facilitates the collection of operational expenses for overhead and underground distribution systems.

ANSWER:

Sections 2.6 and 2.7 of Gulf's Storm Hardening Plan provide the mechanisms for collecting needed forensic data after storms. This collection of data, supported by a more granular accounting process consisting of an expanded number of work orders and accounts for overhead and underground construction and repairs, will provide this information.

35. Please describe the process and metrics Gulf uses to ensure that cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.

ANSWER:

Sections 2.6 and 2.7 of Gulf's Storm Hardening Plan provide the mechanisms for collecting needed forensic data after storms. This collection of data, supported by a more granular accounting process consisting of an expanded number of work orders and accounts for overhead and underground construction and repairs, will provide this information. Gulf will utilize existing reporting systems and develop others as needed to monitor and measure the success of projects. This will lead to the appropriate adjustment of its Storm Hardening Plan.

36. Please refer to Gulf's estimated benefits associated with its vegetation program on pages 6 through 10 and similar filing in Docket No. 060198-EI. Please explain why Gulf elected to make estimates of benefits associated with its vegetation program in Docket No. 060198-EI, but elected to wait for actual storm event data to determine benefits associated with its Storm Hardening Plan.

ANSWER:

Withdrawn.

Estimate of Costs and Benefits to Third-Party Attachers

37. Please identify all specific assumptions third-party attachers should use in estimating cost impact from Gulf's plan for each year from 2007 through 2009.

ANSWER:

Third party attachers should assume the following: (1) any new permit application or overlashing notification will require a pole strength and loading analysis; (2) the cost of any make-ready required to accommodate a new attachment or overlashing will be at the cost of Grade B construction. Gulf expects that the incremental increase in pole attachment rental rates (if any) due to targeted hardening of critical infrastructure and Grade B construction will be minimal.

38. Please identify all specific assumptions third-party attachers should use in estimating benefits accruing from the implementation of Gulf's plan for each year from 2007 through 2009.

ANSWER:

The benefits to third-part attachers will be avoided restoration costs, improved customer satisfaction, and increased revenues. Gulf does not have further information which would enable third-party attachers to estimate the benefits of Gulf's plan.

39. Please provide the total number of joint use poles that Gulf's plan will impact for each year from 2007 through 2009.

ANSWER:

	2007	**2008**	**2009**
EWL critical infrastructure and major thoroughfares poles =	149	140	161
Pole Strength and Loading engineering assessments =	500	500	500

Gulf Power Company will be doing Pole Strength and Loading assessments on approximately 500 third party attachment poles per year for 2007-2009. Until Gulf has evaluated each pole, it cannot provide the exact number of joint use poles that will be impacted if impacted is defined as changed out or requires construction work by Gulf or an attacher. The storm hardening plan will impact any joint use pole for which there is a new attachment request or overlashing notification. The actual number of poles affected by new attachment requests or overlashing notification is not known to Gulf, but instead known only to the attachers.

40. Please state the estimated number or percentage of joint use poles that will be impacted by Gulf's Plan for each third-party attacher for each year from 2007 through 2009.

ANSWER:

The estimated number of joint use poles to be evaluated is 1950 for 2007-2009. Note that until Gulf has evaluated each pole, it cannot provide the exact number of joint use poles that will be impacted, if impacted is defined as changed out or requires construction work by Gulf or an attacher. The storm hardening plan will impact any joint use pole for which there is a new attachment request or overlashing notification. The actual number of poles affected by new attachment requests or overlashing notification is not known to Gulf, but instead known only to the attachers.

Gulf's approximate total number of joint use poles, based on data collected in 2006, is 165,000. This includes all forms of third party attachers.

41. Please identify the incremental hardening cost for each year from 2007 through 2009, which are attributable to third-party attachers.

ANSWER:

Gulf Power Company does not know the incremental hardening cost for each year from 2007 through 2009, which are attributable to third-party attachers yet, and will not know until it has the results from the pole strength and loading assessments.

42. Please identify the proportion of incremental hardening costs attributed to third-party attachers perceived to be PSC mandated.

ANSWER:

At this time, insufficient data exists for Gulf to assign a proportion of incremental hardening costs to any attacher.

43. For each circumstance where costs are attributed to third-party attachers, please describe the methodology that will be used by Gulf to assign costs among third-party attachers.

ANSWER:

Generally speaking, the cost-causer pays. There are four circumstances where "hardening" can occur (though sometimes incidental to Gulf's normal course of business with third party attachers):

1. Replacement of poles or reconstruction of lines arising out of Gulf's 500 poles per year inspection;

2. Replacement of poles or reconstruction of lines at Grade B as part of make-ready;

3. New construction at Grade B; and

4. Targeted hardening of critical infrastructure.

Under situation (1), the cost allocation for any loading or other violations discovered during the inspection will depend on the nature of the violation, the cure for the violation, and the cause of the violation.

Under situations (2) and (3), costs will be allocated in the normal course of business between Gulf and third party attachers. Nothing will change as a result of Gulf's hardening plan, other than perhaps an increase in the actual costs due to the difference between Grade C construction and Grade B construction.

Under situation (4), Gulf does not plan to recover costs directly from attachers.

44. Please describe the process that Gulf will use to notify third-party attachers when a pole is being storm-hardened.

ANSWER:

Gulf Power Company is currently negotiating a process with third party attachers that will be embodied in the details of company contracts. Generally, as detailed engineering drawings and plans are developed on poles that will be upgraded, Gulf will use one of the following electronic means to notify attachers: telephone, e-mail, and the National Joint Use Notification System (NJUNS) to advise an attacher of the impending changeout of a pole.

45. Please describe the process that Gulf will use to determine each third-party attachers' share of the cost when a pole is being storm-hardened.

ANSWER:

See response to Interrogatory No. 43.

Estimate of the Effect on Reducing Storm Restoration Costs and Customer Outages

46. Please provide Gulf's estimated reduction in storm restoration costs and customer outages for each of its storm hardening activities for the years 2007 through 2009.

ANSWER:

See Appendix 7 of Gulf's Amended Storm Hardening Plan.

47. Please describe the process and metrics Gulf uses to ensure that total program cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.

ANSWER:

See response to Interrogatory No. 35.

AFFIDAVIT

STATE OF FLORIDA)
)
COUNTY OF ESCAMBIA)

Docket No. 070299-EI

Before me the undersigned authority, personally appeared Susan D. Ritenour, Secretary and Treasurer and Regulatory Manager of Gulf Power Company, and who on behalf of said corporation, being first duly sworn, deposes and says that pursuant to Rule 1.340(a), Florida Rules of Civil Procedure, she verifies that the foregoing answers to the interrogatories are submitted on behalf of said corporation, and that the foregoing constitute true and correct answers to the best of her knowledge, information, and belief based on the information provided by others in the course of business. She is personally known to me.

Susan D. Ritenour

Susan D. Ritenour
Secretary and Treasurer and Regulatory Manager

Sworn to and subscribed before me this 13th day of August, 2007.

Brame Nye Holsinger

Notary Public, State of Florida at Large

BRAME NYE HOLSINGER
MY COMMISSION # DD 401210
EXPIRES: April 10, 2009
Bonded Thru Notary Public Underwriters

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company.	)	Docket No.: **070299-EI** Date Filed: August 15 , 2007

GULF POWER COMPANY'S NOTICE OF SERVING RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1-47)

GULF POWER COMPANY ("Gulf Power", "Gulf", or "the Company"), by and through its undersigned counsel, hereby gives notice of serving the Company's responses to Staff's First Set of Interrogatories (Nos. 1-47) to Lorena A. Holley, Esq., Florida Public Service Commission, on August 15, 2007.

Respectfully submitted the 15TH day of August, 2007,

JEFFREY A. STONE
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Attorneys for Gulf Power Company

AUG 16 2007

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true copy of the foregoing was furnished by regular U. S. mail, all this 1ST day of August, 2007, on the following:

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company.	)	Docket No.: **070299-EI** Date Filed: September 24, 2007

GULF POWER COMPANY'S RESPONSES TO
STAFF'S SECOND SET OF INTERROGATORIES (NOS. 48-53)

GULF POWER COMPANY ("Gulf Power", "Gulf", or "the Company"), by and through its undersigned counsel, hereby submits the Company's responses to Staff's Second Set of Interrogatories (Nos. 48-53) on the following pages.

Respectfully submitted the 24th day of September, 2007,

JEFFREY A. STONE
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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In Re: Petition for Approval on Gulf Power Company's Storm Hardening Plan Pursuant to Rule 25-6.0342, F.A.C.	)	Docket No. 070299-EI

Index to
Gulf Power Company's
Response to Staff's Second Set of Interrogatories, Nos. 48-53

Item No.	Respondent
48	Edward J. Battaglia
49	Edward J. Battaglia
50	Alan G. McDaniel
51	Alan G. McDaniel
52	Not Applicable
53	Not Applicable

48. What is Gulf's annual revenue requirements for the Company's Storm Hardening Plan from 2004 through 2009 for each of the following sub-components:

a) Wooden Pole Inspections
b) Ten Storm Hardening Initiatives
c) Compliance NESC Extreme Wind Loading Standards
d) Mitigating flood and storm surge damage to underground and supporting overhead facilities
e) Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance
f) Other Distribution Hardening Activities

ANSWER:

Based on discussions with FPSC Staff, it is Gulf's understanding that Staff is focused on incremental costs, which would be for the years 2007 through 2009. Therefore, the following represents Gulf's incremental annual jurisdictional revenue requirements for each of the sub-components by year:

	2007	2008	2009	Total
a) Wooden Pole Inspections	$ 397,321	$ 486,339	$ 554,075	$ 1,437,735
b) Ten Storm Hardening Initiatives	$ 1,650,236	$ 1,831,322	$ 1,995,421	$ 5,476,979
c) Compliance NESC EWL Standards	$ 227,928	$ 390,839	$ 451,606	$ 1,070,373
d) Mitigating flood and storm surge damage to UG and supporting OH facilities	See Note 1			$ -
e) Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance	See Note 2			$ -
f) Other distribution hardening activities	$ 96,491	$ 96,491	$ 96,491	$ 289,473

Note 1 – Incremental costs for this sub-component of Gulf's Plan for pilot underground projects and the use of stainless steel (SS) transformers were not included in the revenue requirement calculation. The cost of the pilot underground projects will be borne by the customer, and the cost of the SS transformers has already been included in Gulf's capital forecast since Gulf has historically installed SS transformers due to their effectiveness in resisting weather and reducing customer interruptions.

Note 2 – Gulf has always recognized that accessibility to distribution facilities is essential to safe and efficient maintenance and storm restoration. Since this activity is already integral to our construction practices, there is no incremental cost impact.

49. What is Gulf's current incremental cost for upgrading a grade C pole to grade B pole for 2007?

    a. What is Gulf's current incremental cost for upgrading a grade B pole to a grade A pole for 2007?

ANSWER:

Gulf's estimated cost for upgrading from grade C to grade B was not developed on a pole unit basis, but was developed based on designing the 210 lot typical subdivision layout to grade B. The assumption was made that this would represent the average construction to be expected company wide on Gulf's system taking into consideration both feeder and lateral construction. Designing this layout to grade B resulted in a range of added construction needs such as larger down guys, larger span guys, larger anchors, higher strength poles, and added anchors. Converting these estimated costs to a cost per pole yielded an average estimated incremental cost for upgrading a grade C pole to a grade B of $36.00.

a. Gulf's estimated cost for upgrading from grade C to grade A (assuming grade A is defined as Extreme Wind Loading or EWL) was developed using a combination of estimates of feeder conversions to EWL then converting to a per mile basis and by also using some representative poles in the 210 lot typical subdivision layout. This incorporated a range of added construction needs such as larger down guys, larger span guys, larger anchors, higher strength poles, reinforcing poles and added anchors. The results indicate an average estimated incremental cost for upgrading a grade C pole to a grade A (EWL) of $2,100.

50. Is Gulf currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?

ANSWER:

Yes.

51. If your response to Staff Interrogatory No. 50 is yes, please give examples of the level of information Gulf exchanges using NJUNS.

ANSWER:

Gulf uses NJUNS to notify its third-party attacher to attach to new poles, request third-party attachers to transfer to changed-out poles, to remove attachments from poles being removed, and to lower or raise attachments due to NESC safety violations.

52. If your response to Staff Interrogatory No. 50 is no, is Gulf planning on using NJUNS in the future for notifying parties of utility construction activities?

ANSWER:

Not applicable.

53. If your response to Staff Interrogatory Number 52 is yes, please describe how, when and with whom will Gulf use NJUNS to exchange information regarding construction activities.

ANSWER:

Not applicable.

AFFIDAVIT

STATE OF FLORIDA)
)
COUNTY OF ESCAMBIA)

Docket No. 070299-EI

Before me the undersigned authority, personally appeared Susan D. Ritenour, Secretary and Treasurer and Regulatory Manager of Gulf Power Company, and who on behalf of said corporation, being first duly sworn, deposes and says that pursuant to Rule 1.340(a), Florida Rules of Civil Procedure, she verifies that the foregoing answers to the interrogatories are submitted on behalf of said corporation, and that the foregoing constitute true and correct answers to the best of her knowledge, information, and belief based on the information provided by others in the course of business. She is personally known to me.

Susan D. Ritenour

Susan D. Ritenour
Secretary and Treasurer and Regulatory Manager

Sworn to and subscribed before me this 24th day of September, 2007.

Brame Nye Holsinger

Notary Public, State of Florida at Large

BRAME NYE HOLSINGER
MY COMMISSION # DD 401210
EXPIRES: April 10, 2009
Bonded Thru Notary Public Underwriters

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

IN RE: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Gulf Power Company

Docket No.: **070299-EI**

CERTIFICATE OF SERVICE

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S. D. Ritenour
J. A. Stone (3 copies)

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BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of:

REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY TAMPA ELECTRIC COMPANY.	DOCKET NO. 070297-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY PROGRESS ENERGY FLORIDA, INC.	DOCKET NO. 070298-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY GULF POWER COMPANY.	DOCKET NO. 070299-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY FLORIDA POWER & LIGHT COMPANY.	DOCKET NO. 070301-EI

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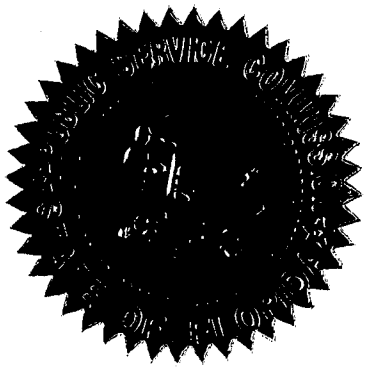

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TELEPHONIC
DEPOSITION OF: ALAN G. McDANIEL

TAKEN AT THE
INSTANCE OF: The Staff of the Florida
Public Service Commission

FLORIDA PUBLIC SERVICE COMMISSION

PLACE:	Room 362 Gerald L. Gunter Building 2540 Shumard Oak Boulevard Tallahassee, Florida
TIME:	Commenced at 10:00 a.m. Concluded at 11:32 a.m.
DATE:	Thursday, September 20, 2007
REPORTED BY:	JANE FAUROT, RPR Official FPSC Reporter (850) 413-6732

FLORIDA PUBLIC SERVICE COMMISSION

APPEARANCES:

RUSSELL BADDERS, ESQUIRE, Beggs & Lane, P.O. Box 12950, Pensacola, Florida 32591 and ERIC LANGLEY, ESQUIRE, representing Gulf Power Company.

JOHN SEIVER, ESQUIRE, Davis Wright Tremaine LLP, 1919 Pennsylvania Ave., NW, Suite 200, Washington, D.C. 20006, appearing on behalf of Florida Cable Television Association.

LISA BENNETT, ESQUIRE, FPSC General Counsel's Office, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850, appearing on behalf of the Commission Staff.

Hearing Exhibit - 000396

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EXHIBITS

NUMBER:	ID.
(No exhibits.)	

Hearing Exhibit - 000398

S T I P U L A T I O N

IT IS STIPULATED that this deposition was taken pursuant to notice in accordance with the applicable Florida Rules of Civil Procedure; that objections, except as to the form of the question, are reserved until hearing in this cause; and that reading and signing was not waived.

IT IS ALSO STIPULATED that any off-the-record conversations are with the consent of the deponent.

Hearing Exhibit - 000399

P R O C E E D I N G S

MS. BENNETT: I'm ready to start. How about you all?

MR. BADDERS: We're ready to go. We have the witnesses here, if you want to go ahead and go on the record and see who is in the room and take appearances.

MS. BENNETT: That would be great. Let's start with who is on the telephone, first.

MR. BADDERS: We will go ahead and start. Of course, this is Russell Badders with the law firm of Beggs and Lane, on behalf of Gulf Power Company. With me Eric Langley, of the law firm of Balch and Bingham, also appearing on behalf of Gulf Power Company. Alan McDaniel, Gulf Power. Ed Battaglia, Gulf Power Company. Jerry Mintz, Gulf Power Company, and Mary Davis who will the notary who will swear in the witnesses who is my administrative assistant.

MS. BENNETT: Thank you. I did hear another telephone line come in.

MR. SEIVER: Yes. John Seiver for FCTA.

MS. BENNETT: Welcome, John.

Anyone else on the telephone?

In the Commission meeting room, this is Lisa Bennett on behalf of the Office Public Counsel's Office -- General Counsel's Office for the Public Service Commission, and I'm going to let everyone introduce themselves around the room.

MS. HARVEY: Lisa Harvey.

Hearing Exhibit - 000400

MS. LEWIS: Kathy Lewis, Staff.

MR. VINSON: Carl Vinson, Staff.

MR. FISHER: Lynn Fisher, staff.

MS. BENNETT: Okay. And I believe we are ready to start with you, Mr. McDaniel. If you would, go ahead and swear the witness in.

(Witness sworn by Notary Public.)

MR. BADDERS: We will go ahead get that signed and we will fax it over to you. And we will bring the original or we will attach the original to the deposition when we get it.

MS. BENNETT: All right, thank you.

ALAN G. MCDANIEL

was called as a witness and, after being duly sworn by the court reporter, testified as follows:

DIRECT EXAMINATION

BY MS. BENNETT:

Q Mr. McDaniel, this is Lisa Bennett and I'm with the Public Service Commission and not the Office of Public Counsel that I said earlier.

If you have any concerns or do not understand a question, I would ask that you ask me to explain it and I will do my best to clarify the question.

Let's start with having you state your name and business address.

A My name is Alan G. McDaniel. My business address is

Hearing Exhibit - 000401

One Energy Place, Pensacola, Florida 32520.

Q And did you provide testimony in Docket Number 070299, Mr. McDaniel? (Pause.)

Did you hear my question?

A Yes, I did.

MR. BADDERS: Are you not able to hear us?

MS. BENNETT: There's a lot of static, and I did not hear a response at all from Mr. McDaniel. Let's try that again.

BY MS. BENNETT:

Q Did you provide testimony in Docket Number 070299?

A I did.

Q And the purpose of your testimony was to address Sections 11 and 12 of Gulf's storm hardening plan, is that correct?

A Yes, ma'am.

Q And Section 12 deals with third-party attachers, is that correct?

A Yes, ma'am.

Q Are you familiar with Witness Kirk's testimony for AT&T?

A Kirk Smith's testimony?

Q Kirk Smith's testimony.

A I am.

Q In his testimony, Witness Kirk Smith states that

Hearing Exhibit - 000402

Gulf, as well as other utilities, have agreed to a third-party attacher process. Has Gulf agreed to the revised third-party attacher process?

A Gulf has agreed to it.

Q And in its plan Gulf included some preliminary cost/benefit data it had collected from third-party attachers. Since the time the plans were filed, several meetings and workshops have been held with the purpose of explaining the plans or exchanging information. Has Gulf made any attempt to update the third-party attachers' cost/benefit information filed in Gulf's plan?

A We have. We have not received any additional information since the first information we received on that and filed in our original plan.

Q Did Gulf's plan filed with the Commission include cost/benefit data from all affected third-party attachers in your service territory?

A It is.

Q In general, does Gulf's pole joint use agreements with third-party attachers currently assign financial responsibility when a pole is overloaded or when an attachment is unauthorized?

A It does.

Q Can you characterize your agreement on pole replacements?

Hearing Exhibit - 000403

A Could I ask for clarification on that question, please? When you say characterize --

Q Just a minute.

(Off the record.)

BY MS. BENNETT:

Q I asked you to characterize your agreement on pole replacements and you asked for a clarification. We're looking for general financial responsibility, who is going to be financially responsible if a pole is moved?

A Okay. If a pole is moved, it depends on who is requesting that the pole be moved. Generally, the cost-causer are what our contracts assign the costs by.

Q And then I asked about moved, now let's talk about if it was replaced?

A If a pole is replaced, it is very similar. Depending on who requests or requires that a pole be replaced, they generally pay for that cost.

Q If it's for storm hardening purposes, who would pay?

A If Gulf determines that a pole should be replaced because of storm hardening, Gulf would pay for that pole to be replaced.

MS. BENNETT: Okay. That is all the questions I have. Let's go off the record for just a minute.

(Off the record.)

MS. BENNETT: Now, Russell, do you want to go ahead

Hearing Exhibit - 000404

with Mr. Seiver's cross-noticed questions, or do you need to ask your witness questions?

MR. BADDERS: We can go ahead and continue with Mr. Seiver's questions.

MR. SEIVER: All right. Thank you, Russell.

CROSS EXAMINATION

BY MR. SEIVER:

Q Good morning, Mr. McDaniel. My name is John Seiver, I'm co-counsel for the Florida Cable Telecommunications Association, or FCTA.

How are you today?

A I'm doing well. How are you, John?

Q Good, thank you.

Alan I wanted to ask you some questions that I'm going to probably work backwards from your rebuttal testimony. I'm also going to probably ask about some of the answers to staff's and to our interrogatories. Are those handy or convenient?

A Yes, sir.

Q And do you also have the storm hardening plan in case you need to refer to that?

A I do.

Q And one last thing, do you have the Gulf Power responses to the City of Panama Beach interrogatories?

A Yes, sir.

Hearing Exhibit - 000405

Q Great. All right.

Mr. McDaniel, my first question, if you would turn to Page 4 of your rebuttal testimony?

A Okay.

Q Looking on Lines 4 and 5 where you are -- at 4, 5, and 6 where you discuss the changes in the amended plan, you proposed to move from Grade C to Grade B standards for construction. My first question is that is the standard for new construction, is that right?

A Yes, sir.

Q And why did you propose to move from Grade C to Grade B for new construction?

A Primarily, as we looked at our system, recognizing that we could make some possible improvements, we felt that it would be appropriate to potentially strengthen our system by going from Grade C to Grade B.

Q Do you know if any portion or percentage of your existing system is already at Grade B?

A I do not know the exact percentage.

Q Can you give me an approximate percentage?

A No, sir, I cannot.

Q Would it be fair to say, though, that some of Gulf's plant is at Grade B already?

A Yes, sir, that's very possible.

Q Would you expect it to be maybe either the feeders or

Hearing Exhibit - 000406

some of the other more critical or taller structures than the distribution poles?

A Possibly so. It's difficult to tell without us doing any calculations on all of it.

Q And if I stray into what might be Mr. Battaglia's -- am I saying his name correct? It's Battaglia?

A It is Ed Battaglia.

Q Oh, you say the hard G?

A Yes, sir.

Q If I crossover into Mr. Battaglia's testimony, just let me know, all right?

A Okay.

Q I had seen a percentage of Gulf's plant that was in rights-of-way versus back lots, and would it be fair to say that most of the poles in the back lots are probably not at Grade B?

A Yes, sir.

Q One other thing that happened in the amendment to the plan as mentioned in the rebuttal testimony is that you removed most of the third-party attachment standards and procedures from the plan. Do see that?

A Yes. You're talking about Lines 6 and 7?

Q That's correct. And you did advise FCTA of this fact as mentioned in Line 9 or 10. Why, if you know, did you not remove all of the standards and procedures?

Hearing Exhibit - 000407

A We felt that it was appropriate, for purposes of people who may not be familiar with the plan and what our standards and procedures were, to have that included in there. We were originally required by staff to include that in the plan. Through discussions with FCTA, we did take out the parts that you primarily requested we would.

Q Were there other parts that we asked you to remove that you did not?

A I do not believe so.

Q But you are not asking the Commission to approve the third-party attachment standards and procedures as part of this docket?

A That's correct.

Q I wanted to ask you about the overlashing issues and that begins on Page 5. Does Gulf Power in deploying its electric power facilities ever use overlashing as a technique for attaching its conductors?

A Not that I'm aware of.

Q That's a technique that's used by the communications attachers, such as the telephone companies and the cable operators, right?

A That has been my experience, yes.

Q And do you understand what the overlash is, the overlashing process is that the communications companies use?

A I understand it from having seen it in the field

Hearing Exhibit - 000408

done. And, generally speaking, I don't know the technical details, but I believe I do know where they take an existing cable that's up there, yes, and overlash it to support another cable.

Q All right. Could you tell me a little bit what you have seen? Have you seen a lashing machine installing them or have you just seen it after it has been lashed?

A Both.

Q And can you just tell me in your own understanding what the process is? I mean, what goes on the pole first for a new attachment and what happens to the lashing and then overlashing?

MR. LANGLEY: John, this is Eric. I'm going to object to the form, just because I think there were about five different questions in there.

MR. SEIVER: Well, I'm happy to have the witness just give me a narrative of what his understanding is of the overlashing process. If he could just give me the steps and I will limit it to that.

MR. LANGLEY: Okay. We are just talking about the overlashing process?

MR. SEIVER: That's correct.

MR. LANGLEY: Okay.

THE WITNESS: And I will qualify that by saying I don't know your technical business, and Gulf has not used that;

Hearing Exhibit - 000409

but from what I have seen, ordinarily there will be an original permitted attachment on the pole the first time that a company has put their cable up, and it will be there usually with one throughbolt attached to the pole.

At some point in time a cable or telephone company will determine that they need to upgrade their facilities to serve additional customers or provide a different service, and what they will do is come out and lay in, if you will, or loosely attach the new cable or fiber, and then they will put the lashing machine on there that wraps a very small steel strand around both those cables and ties them together, if you will. And that machine runs along and they pull it along in a variety of different ways.

BY MR. SEIVER:

Q Are you familiar, Mr. McDaniel, with how an initial attachment by a cable operator is performed on a pole when he is putting up just one cable for the first time?

A Generally speaking, yes, I have seen that occur.

Q Could you just tell me in your own words what you saw?

A What they will do is go along and place rollers on the poles -- once they've got the permit, they will get out there and place rollers on each pole, put a pulling line, a rope up through those rollers, and then pull the cable into place. And then they will go along and drill a hole, put a

Hearing Exhibit - 000410

throughbolt in and attach that first cable to the pole.

Q You don't see them pulling a metal strand and attaching that to the throughbolt first?

A Putting up a guy messenger to attach it to?

Q That's correct.

A They do do that on occasion. I mean, there are two or three different techniques that may occur out there.

Q On most of the runs -- I'm not talking about drops, but on the runs on a main line pole, does that have the steel strand to which the coaxial cable is lashed in the first instance?

A Are you referring specifically to cable TV companies in this discussion?

Q Yes, I'm sorry. I thought that's -- when I started out I was -- I'm just talking about cable television.

A I was thinking you might be referring to the others. But, generally speaking, that's what they do; they put up a guy messenger and then come and put their cables to it.

Q And the cables are overlashed to that messenger?

A They will use the steel strand, the small steel strand and wrap it around it and put it up.

Q And before any initial attachment is made, that has to be permitted by Gulf, isn't that right?

A That's correct.

Q But after that initial attachment is made, prior to

Hearing Exhibit - 000411

the storm hardening plan, if the cable operator wanted to add a cable to the existing cable and messenger by way of overlashing, there was no further permitting required, is that right?

A At the present time, Gulf doesn't have any process in place for that.

Q You said heretofore you have not had a process for approving or examining overlash by the cable operators, is that right?

A That's correct.

Q Do you have any data or evidence that shows any overloading or problems with poles as the result of a cable operator's overlash of a cable onto an existing authorized and permitted attachment?

A We do not have that at this time.

Q Are you personally aware of any problems caused by a cable operator's overlash to an existing permitted attachment?

A No.

Q Is that something that you would be aware of in the normal course of your business and duties with Gulf Power?

A No, not in the job I am in now. That is a district or operational issue that they might know about, but it would not necessarily get reported to me.

Q All right. I wanted to ask you, if you could, look at the responses that Gulf Power made to the City of Panama

Hearing Exhibit - 000412

Beach, Florida's interrogatories. They were filed on August 2nd.

A Give me just a minute.

Q Sure. It is a big document.

A Do you have a particular number?

Q Yes. I was going to ask you if you could look at -- it is Item Number 49, and it is the beginning of a very long section, Page 1 of 105.

A Okay. Hold on just a minute, John.

Q Sure.

MR. LANGLEY: John, tell us the number again, please.

MR. SEIVER: Item 49. Number 49, Eric.

THE WITNESS: Okay.

BY MR. SEIVER:

Q And this is a question about all claims made against Gulf since January 1, 1997, involving, A, its overhead distribution facilities; I'll skip to B, underground; and then, C, a complete list of all overhead line contact accidents; and, D, all underground contact accidents.

And you will see on Pages 2 and 3 of 105 in Item 49, you've got information that is being provided in conjunction with a motion for protective order. Do you see that?

A Yes.

Q Do you know if that information has been provided?

A I do not.

Hearing Exhibit - 000413

Q Do you know if that information would include any information -- I'm sorry, do you know if that response would include any information on overloaded poles where there was a claim or an accident due to a cable operator's overlashing?

MR. LANGLEY: John, are you asking if this was provided to PCB?

MR. SEIVER: That's correct. And if he knows if that was in there.

THE WITNESS: I do not know, John.

BY MR. SEIVER:

Q Do you know who would know that I could ask?

A No. I would have to look this over. I don't know at this time.

MR. SEIVER: Eric, if you're there, is there a way that I might be able to find out, or do I need to sign onto a protective order to see the responses to A and B?

MR. LANGLEY: I tell you what, that is something that Russell and I can discuss at break, and we might be able to work through that with you.

MR. SEIVER: Okay.

BY MR. SEIVER:

Q Mr. McDaniel, you will see that on Page 3 of 105 under Item 49 there is responses for C and D, which include the overhead line contact accidents. And then starting with, I guess it is a Page Numbered 4, 004, and going onto, I believe,

Hearing Exhibit - 000414

79, is a listing of -- complete list of all overhead line contact accidents whether a claim was filed or not. Do you see that?

A When you say a numbered page --

Q I'm sorry, it's that lower right-hand corner Bates stamped.

A That says 004?

Q Yes.

A Okay.

Q And that 004 says in the middle Page 1 of 76.

A Yes, sir.

Q And then it goes on for a number of pages. Did you participate in the preparation of this response, do you recall?

A No, sir, I did not.

Q Did you have any responsibility for any of the resolutions of the claims or contact accidents that are listed in these pages that we are talking about?

A John, without reading every one of them, I cannot answer yes or no on that question.

Q So it would be fair to say some you may have and others you may not have, it just depends?

A Yes, sir. I would have to look at them. I have had more than one job here.

Q Oh, I see. And there would be -- so it wouldn't be just the Pensacola district, or the Milton district, it could

Hearing Exhibit - 000415

be more than one district where you would have had the experience with the accidents or the claims?

A Yes, sir.

Q Are you generally familiar, though, with the extent of accidents or claims involving overhead line contact accidents?

A I would have to say very generally. It's entirely possible things happened that I do not know about and I don't get informed about because it depends on where it happens.

Q Would you be able to tell me -- to agree or disagree with a conclusion that the vast majority of the contact accidents are through a car hitting a pole?

A No, sir, I cannot agree or disagree with that.

Q All right. Thank you.

MR. SEIVER: And, Eric, if you have a moment at the break, if you could talk to Russell about if there is anybody within Gulf that might be able to help me answer that question.

MR. LANGLEY: We'll talk about that.

MR. SEIVER: Thank you.

BY MR. SEIVER:

Q Going back to your rebuttal testimony, Mr. McDaniel.

A Hold on just a minute. Okay, John, go ahead.

Q On Page 6, in your discussions with Mr. O'Kelly (phonetic) from Cox, and then some -- you mention FCTA member operators, if you go down to Line 19 going through to the end

Hearing Exhibit - 000416

of the page you make a comment that you had the impression that FCTA would not be objecting to the overlashing policy in its entirety, and that you were not aware that there would be any problem with a prior notice requirement. Do you see that?

A Yes, sir.

Q Your overlashing policy, though, that you are developing is more than just a prior notice requirement, isn't it?

A Could you clarify that question?

Q Well, is it simply that a number of days before the operator overlashes they just say, hey, we're going to overlash the poles on Route 98, and they just go and do it?

A No, sir, our expectation would be to be notified and given the opportunity to go look at it, the locations where it would be, and do pole strength and loading on it, if appropriate.

Q So you would have to approve it before it could be overlashed, the overlashing could be done?

A Can you define the term approve?

Q Give some sort of indication back to the overlasher that it's okay to go ahead?

A I would say what we agreed to do was give written notification back that we had looked at it and it was acceptable to proceed with the work.

Q And the operator could not proceed with the work

Hearing Exhibit - 000417

until they had received that written word back from you, is that right?

A Yes, sir.

Q So, it is -- and I don't want to argue with you, but that is a little bit more than just giving notice, isn't it?

MR. LANGLEY: Object to the form.

A What we would require -- you know, there's much more that goes into this than just when we do the pole strengthening, there may be some cost associated with that that they would -- you know, the process would be we go look at it, we determine what needs to be done so that those poles can support the burden that's being placed on them, and then provide what costs might be necessary or recommendations through talking to the people who are requesting it in the field about here are the options they would have.

Q Would you agree that the cable operator doing the overlashing could perform their own loading analysis and just go ahead with the overlashing instead of waiting for Gulf to perform the loading analysis and giving its approval?

A Could you repeat the question?

MR. SEIVER: Madam Court Reporter, could you read that back, please, for the witness?

(Question read by reporter.)

THE WITNESS: John, not at this time. We have no prior experience with overlashing. No knowledge of the volume,

Hearing Exhibit - 000418

no knowledge of what the impact will be, and Gulf needs to develop some experience with that.

BY MR. SEIVER:

Q Well, overlashing has been a fairly common practice for cable operator attachers, at least, from the very beginning, hasn't it?

A I do not know, because we have not ever been told when overlashing was occurred unless we saw it in the field. Our concern is the additional burden placed on the pole and what its effects will be that might overload the pole.

Q Let me just ask you, on Page 7 of your rebuttal in Lines 11 and 12, you state that overlashing is a relatively new process in Gulf's service area. Do you mean new to Gulf or new to the cable operators that have been overlashing?

A On Lines 11 and 12 what I'm saying there is it is new to Gulf, relatively speaking.

Q Because you recall we were talking about it before that the way the cable operators do their initial attachments is generally by messenger strand and then overlashing their wire to that, correct?

A Yes, sir. When we're talking about -- the differentiation I would make on that, when you were talking about the guy strand being put up and the first attachment to a pole.

Q Right.

Hearing Exhibit - 000419

A Although that process uses an overlasher piece of equipment, that's a first installation, and I'm not defining that as overlashing. Our definition of overlashing is you have an initial attachment, permitted attachment up there, and then you come back and want to add additional cables or burdens to that pole without getting another permit.

Q All right. Well, then, maybe what we'll do is for ease, if you are all right with it, we will call the initial attachment a lashing, and then any subsequent addition to that existing attachment would be an overlashing. How's that?

MR. LANGLEY: John, this is Eric. I mean, the terms he uses in his testimony are new attachment and overlashing. Is there a problem with sticking with that terminology?

MR. SEIVER: Well, all right, I'll try to make it clear. I just don't want him to misunderstand me, and I guess I don't want to misunderstand the witness, so let's see where we go.

BY MR. SEIVER:

Q Mr. McDaniel, have you done any loading analysis yourself on any existing attachments in Gulf's service area where there are cable operator attachments that also include overlashed cables?

A I don't recall any, John.

Q Do you know if anybody else at Gulf has done that loading analysis on any existing overlashed cables?

Hearing Exhibit - 000420

A I do not.

Q You haven't seen the result of any of that kind of analysis?

A When you put the qualifier on there about overlashing, I don't know -- because we have not been notified about overlashing occurring, I don't know that somebody is going out there when they do any type of loading analysis that they would say, well, that has overlash on it.

Q Well, in preparation for your storm hardening plan, which includes provisions for doing a loading analysis for overlashing, I guess my question is did you do a dry run or take Pole Foreman and sit down and see what would happen out in the field just to see what the results were?

A Yes, sir, we have done that. We have done some pole strength and loading, and we have looked at that and the effects of what the possible solutions are. When you qualified it with overlashing, I just don't know if our people were getting to the detail of what exactly was installed by each one of the companies on the pole.

Q But you do have some results of this initial loading analysis that you performed on the poles?

A I believe so.

(Off the record discussion.)

BY MR. SEIVER:

Q Mr. McDaniel, let me just tell you, we haven't been

Hearing Exhibit - 000421

going that long, but if there comes a point when you want to take a break, just please let me know and we can accommodate you. All right?

A Yes, sir.

Q Mr. McDaniel, on the overlashing loading analysis, have you any knowledge as to the relative impact on the loading on a pole of an existing attachment for a cable operator with an overlashed cable versus the electric power conductors on the top of the pole?

MR. LANGLEY: Object to the form.

Q Do you understand my question, Mr. McDaniel?

A I'm not sure that I do understand completely what you're asking me.

Q Well, I will try to restate it. Do you have any understanding of the relative impact on the loading of a pole of the cable operator's existing attachment with an overlashed cable versus the power company's attachment or attachments of power conductors on the pole, on the same pole?

A What you are asking is the relative load that each one of them places on the pole?

Q That's correct.

A Generally speaking, the electric utility does place the majority of the load on the pole. However, it depends on the particular -- each individual pole is unique out there, and then when you throw the qualifier of overlashing in there,

Hearing Exhibit - 000422

which I would interpret as an existing cable with one or more then strapped to it, it's tough to say that might overload a pole more than what we have up there on the pole, what a power company would have on the pole.

Q Well, have you done that analysis to see what the impact is?

A No, sir, we have not. But from an engineering perspective it would -- you can say that if you put seven cables up on our pole and we only have one streetlight wire up on that pole, the overlashed cable would probably add more load to the pole than our facilities would.

Q And putting aside wind for the moment, if the communications cables, let's say the bundle of seven -- well, let me ask you, did you pick seven just to have an extreme number, or are you familiar with some overlashes that include as many as seven cables on one strand?

A I've seen pictures where there was more than one or more than two strapped to a pole, or overlashed. I've seen pictures that had several to it, so my point was you could overlash more than one or two. You could put many out there specifically at this time Gulf would not know about, and there are many cases where we have poles relatively lightly loaded with our equipment and lines, and other third-party attachers have many attachments on it.

Q If the cable operator's initial attachment or

Hearing Exhibit - 000423

overlash attachments are guyed through the permitting process and make ready to ensure that the initial attachment is consistent and allowed, are you aware or do you have an understanding that adding one additional cable, for example, to the attachment could result in an overloading condition on a particular pole?

A John, I would say it's entirely possible depending on the diameter and the weight of that one additional one that was put on there. It could overload it.

Q And it would also depend, I guess, on the existing strength of the pole that's in place, is that right?

A Yes, sir. Several factors would come into play there to determine if a pole was overloaded or not.

Q Do you have a routine inspection program for your poles in place now?

A Yes, sir.

Q Is loading one of the items that's included in the existing inspection program?

A I don't believe so.

Q If you examine a pole under the new inspection plan, under the storm hardening plan, and you find that it is overloaded, will you attempt to make a determination as to who caused the overloading, or will the pole simply be replaced at Gulf Power's expense?

A Could you expand or clarify on that; when you say

Hearing Exhibit - 000424

overloaded, what you mean?

Q If you perform a pole strength and loading analysis on a particular pole, and it's not adequate under, let's say, Grade C, would you -- to hold the attachments on that pole as they are configured, would you replace the pole or change it out at someone's expense or at Gulf Power's expense?

A If we went out to look at the pole in question for storm hardening purposes, absent any violations on that pole, and we looked at it and determined it was overloaded, Gulf would change that pole out at our expense.

Q Will there be any effort in that pole inspection process to assign responsibility to another attacher for an overloaded condition, such as failure to guy or some other corrective type action that could be taken to relieve the overloaded condition?

A John, if someone has an approved permitted attachment on that pole and we have allowed them to get on that pole, and absent -- what we would do is work with them if they needed to guy that pole or do something. And if we determine we need to change that pole out, there would not be any cost assigned to somebody.

Q If the pole meets Grade C standards, but not Grade B for new construction, would you still be changing that pole out if you come across it in the inspection process?

A You're saying if it meets Grade C?

Hearing Exhibit - 000425

Q Yes, but not Grade B.

A But it's an existing pole?

Q An existing pole with existing attachments.

A And we look at it and do pole strength and loading on it and we find that it is acceptable?

Q For C; for Grade C, yes.

A Then unless we have another reason to change it out, we would not do anything with that pole. Is that what you're asking? If we went and just picked a pole out in the field and analyzed it today, what we would look at it based on the standards it was built at, and if it met those standards we wouldn't do anything else with that pole.

Q Right. And I appreciate that, that was my exact question. And how many poles -- do you know how many poles you are planning to inspect under the storm hardening plan every year?

A Can you hold on just a minute?

Q I think it's in here, I just don't have it in front of me.

A Well, we have it broken down into a couple of different categories. I'll have to look at it by year, if you will give me just a minute.

Q I think you start probably on Page 9 of your rebuttal.

A And what I'm talking about are poles that we put in

Hearing Exhibit - 000426

our plan that we said we would look at the poles that were -- there is going to be 500 a year that we would go look at just to determine if they met the pole strength and loading requirements. There are some additional poles.

Q Right. On Page 10, then, confirming that what you just testified to on Line 17 to 20, the poles meet Grade C, no further action is required absent the other issues. But is it true that if it fails to meet Grade C, then it will be changed out, but put up to Grade B, is that right?

A Generally speaking, yes, sir.

Q At whose expense would that incremental increase in the strength up to Grade B be charged to?

A Based on the way you have formed the question, Gulf Power.

Q And, I guess, would that depend on what you mentioned as being the absence of other issues on the pole?

A Yes.

Q And in that sense, other issues would be an NESC violation or maybe an unauthorized attachment, something like that?

A Yes, that's correct.

Q Are there any other -- quote, other issues, end quote, that you consider to be significant in making the determination to improving the pole to Grade B?

A None that I can think of. I just qualified it

Hearing Exhibit - 000427

because you never know what you will find in the field.

Q Right. If, for example, there is a separation or a clearance issue that could be remedied by a rearrangement, for example, or retentioning sag, would you consider that, for example, as a remedy, or would you redesign the pole to go to Grade B?

A From the way you said that, it would have to meet Grade C as it is out in the field now. In other words, we didn't follow strength and loading. You are asking if the only thing we found were violations that could be corrected, we would first work with the attacher who could do the things you identified there, and if that cleared the problem up, we would leave the pole alone.

Q Would the same go for perhaps additional guying? I know the examples I was giving you did not necessarily affect the loading analysis, they were either a clearance or sag issue. But if, for example, you have an otherwise adequate Grade C pole that was permitted to Grade C, would you allow an additional guy to be installed to bring it into compliance as opposed to changing it out and going to Grade B? To bring it back up to an adequate Grade C is what my question is, I guess.

A I think on a case-by-case basis. When you say Grade C, what do you have in mind there?

Q Well, my only -- and I know it is difficult to do it without looking at an individual pole and evaluating it as it

Hearing Exhibit - 000428

stands there, but I could see a situation where a guy wire is broken, or an anchor is pulled out, and that pole is in trouble. And it could meet the, you know, concept that there is another issue on this pole and you should change it out and go to Grade B, or would you allow it be reguyed, just like I asked about the rearrangement or the tightening of the sag, to go back to, you know, a full Grade C compliant pole?

A We would certainly work with the particular attacher to see if that would get it to meet the standard, then we would allow that to happen.

Q Thank you.

When you're proposing to go to Grade B now for new construction, is there a new plan or process in place for generally about how you're going to perform that? And the kind of issues I'm looking for, are you going to go to a stronger class of poles, are you looking at concrete or steel instead of wood; can you give me some details like those?

A John, I believe that question would best be answered by Mr. Battaglia.

Q Okay, I'll save that for him.

When you're doing the inspections under the storm hardening plan, where will the expense or the costs of those inspections be booked or allocated, if you know?

A I do not know.

Q Do you have any understanding whether those

Hearing Exhibit - 000429

inspections that you will be doing under the storm recovery plan will be billed directly to any of the attachers on a particular pole?

MR. LANGLEY: John, are you including in your question the pole strength and loading analysis that Gulf is proposing for new attachments and overlashings?

MR. SEIVER: No. I'm talking about the existing poles that they are going to look at, I believe the 500 or so poles annually.

MR. LANGLEY: Okay.

THE WITNESS: Would you restate the question, and it's in the context of just the 500 poles?

MR. SEIVER: Yes.

BY MR. SEIVER:

Q Were those inspections going to be charged, because I believe you are only going to look at poles that have three attachers, is that right?

A Three or more attachers.

Q Three or more. And do many of your poles have more than three attachers?

A Yes, sir, there are locations where we have several attachers on the poles.

Q And when you're using the three, are you including the power company, or are you saying three in addition to the power company?

Hearing Exhibit - 000430

A Three in addition to the power company.

Q And the inspections of those poles, my question was would those particular costs of inspection be billed directly to the attachers or not?

A No, Gulf will pay for that.

Q If, in fact, you determine there is an overloaded pole within that inspection, will you be charging any of the attachers for the replacement of that pole? No, you answered that question already. I withdraw it.

On Page 10 going on to Page 11 of your rebuttal testimony, there is a reference to Mr. Harrelson's claim that Gulf has not yet determined or quantified what is meant by overloading, and your answer is that that is not accurate. And, in essence, an overloaded pole on Page 11 is one that does not meet the strength and loading requirements. Will that be, again, looked at from the standpoint of existing power company conductors as well as the third-party attachers?

A Yes, sir, that's correct.

Q Further down on Page 11 in the cost section, there's a discussion about costs of make ready and annual rent threatening to go up significantly. And you mentioned that the costs to cable operators fall into the three buckets of transfer cost, annual rental, and make ready. The annual rental is a formula that is established by the FCC. Are you familiar with that formula?

Hearing Exhibit - 000431

A I know that it exists. I'm not familiar with the details of the formula.

Q Which accounts are used to calculate and how those accounts are worked into the formula are beyond your responsibility?

A Yes, sir.

Q The cost of transfer is something that -- is what the cable operators have within their particular control, is that right?

A Did you say the transfer costs?

Q Yes, that's correct.

A Yes, sir.

Q And the make ready going forward is something, though, that is more in the control of Gulf Power, is that right?

A When you say in the control of Gulf Power, could you clarify that, what do you mean?

Q Well, do you have any data or understanding -- and answer as best you can -- as to whether for new attachments with the Grade B construction standard that make ready will be more expensive for cable operators than at the existing Grade C construction standard?

A I do not have any information on that. I'm not sure why it would be.

Q Well, under the Grade B, are you going to be using a

Hearing Exhibit - 000432

more expensive or heavier class of pole?

A It depends on the situation. Generally speaking, yes.

Q I'm just trying to determine that if there may be an existing Grade C pole that meets all of your requirements, and cable operators apply, a cable operator applies for a permit to attach to that pole, and because it's going to be a pole that -- an existing pole, would you allow it to be engineered for Grade C without a change-out, or rearrangement, or because it is a new attachment, would you required the cable operator to pay for an upgrade to a Grade B through a change-out?

MR. LANGLEY: Object to the form.

Q Did you understand my question?

A I don't think so. Do you want to restate that?

Q I'm trying to go through a number of situations. I am going to have two questions, and I will break the first one off. I want you to assume that you have got a compliant Grade C constructed pole with your facilities, your electric power facilities on it, and maybe one or more communications attachments on it, but it's all compliant with the construction standard to which it was built, which I'm going to say we will assume was Grade C.

If the operator, cable operator comes along and makes an application for a new attachment to that pole, and that pole would either need to be rearranged or perhaps changed out to

Hearing Exhibit - 000433

accommodate that cable operator for spacing purposes, would the cable operator's make ready be billed to make that pole a Grade B pole, or could it remain at the Grade C standards?

A I believe that's going to have to be changed out to Grade B, John, if you're going to put a new attachment on a pole that is out there now.

Q If it can't be rearranged, if it needs to be a taller pole, if it's 40-foot and you need to put a 45 in so there is clearance, that's going to go to grade Big B then, a new pole?

A Yes, sir.

Q If it could be rearranged, though, could you leave it at Grade C, or because it's a new attachment would it have to be made to Grade B?

A The way you formed it, if we rearrange so that an additional attachment could be placed on that pole --

Q Right.

A -- it's going to have to be changed out to a Grade B.

Q You would not do a rearrangement of, like -- let's assume, for example, that the phone company is on the pole, but they could move down six inches or a foot and still have clearance, and then the cable operator could go above the phone company and still be sufficiently out of the neutral zone, the safety zone, you would not allow that, instead you would require a change-out to Grade B?

MR. LANGLEY: John, to make sure that I understand

Hearing Exhibit - 000434

your question, are you -- I guess one of the assumptions is that the pole would not be overloaded by the new attachment under a Grade C, but a change-out for spacing purposes alone is not required? Are those the assumptions in your question?

MR. SEIVER: That is correct.

THE WITNESS: So what you are asking is if it was an existing pole that meets Grade C, we could rearrange and you put a new attachment on there and it still would not overload it at Grade C, then we would leave that pole in place.

BY MR. SEIVER:

Q So you would allow for a rearrangement?

A Yes, sir.

Q And if it required an additional guy so it would not be overloaded, would you still consider that to be an acceptable way of performing a new attachment?

A Yes, sir.

Q Thank you.

MR. SEIVER: We've been going for just about an hour. I don't have, really, too much more, I would think less than half an hour? Would everybody like to take a break, or does the court reporter need a break?

MR. BADDERS: Could we take, like, a three-minute break real quick.

MR. SEIVER: That's fine with me, if it's fine with everybody else.

Hearing Exhibit - 000435

(Brief recess.)

BY MR. SEIVER:

Q Mr. McDaniel, if you would look at your rebuttal testimony, if you would, on Page 8?

A Yes, sir.

Q And in the question and answer that begins at Line 7, and I will just summarize it, you talk about Mr. Harrelson's testimony and the negligible impact he thought that the third-party attachments have on poles. And, your answer is somewhat of what we talked about already, that electric lines and facilities are a greater load than third-party attachments or overlashing. But the key point is that the pole line was engineered to handle Gulf's facilities, and Gulf always knows when it adds equipment on the pole and whether the pole can handle the additional load.

If a cable operator is making an initial attachment, though, there is always an analysis done to determine make ready requirements for that, am I right?

A Yes, sir.

Q Is the make ready for the initial attachment generally done so that there is additional strength and capabilities on the loading on the pole, or is that initial attachment generally done and made ready only for that one attachment and no more?

A It is usually specific to that attachment that is

Hearing Exhibit - 000436

being requested to be placed on the pole.

Q And in that situation, is the pole, in your experience, generally only engineered so it's right at the limit of its loading ability, or generally does a pole for the initial attachment when the cable operator comes in have additional capacity?

A It depends on the situation. Generally, there might be more room on it.

Q When the third-party attachments are cataloged, you make a comment on Page 8 that they account for the greatest unengineered weight and load burden on Gulf's poles. Do you see that?

A Which lines are you referring to?

Q I'm sorry, Lines 20 through 22. And if you want to read the earlier stuff, you can do that, as well, but I'm really looking at 20 to 22. Do you see that?

A Yes, sir.

Q You only meant additional attachments, not the initial authorized or permitted attachment, is that right?

A Yes, sir, that is what I was referring to.

Q Because the initial and authorized attachments are engineered?

A Yes, sir.

Q An unauthorized attachment is another matter, where a party attaches either without an agreement or without a permit,

Hearing Exhibit - 000437

and I am excepting that out, but generally the only unengineered weight and load burden in your testimony is if the cable operator overlashes a particular cable to their existing authorized attachment?

A Yes, sir.

Q Would it make any difference to you if you knew or there was a requirement that the cable operator perform a loading analysis on their own before they did the overlash?

A Could you explain what type engineering you're referring to?

Q It could be -- okay, let me ask you. I can't really go through it, but what kind of loading analysis by the third-party attacher would be acceptable to Gulf Power prior to an overlash?

A Well, at this time, not having any experience with the volume or the loads that are being placed there by overlashing, Gulf needs to get experience with that and develop a record, if you will, on the impact and become familiar with what the expectations are when calculations are done. So at this time I would not agree to allowing the third party to do that type of engineering.

Q Even if they provided you copies or the results of the engineering?

A John, since this is new to us, not at this time. Once we gain some familiarity with it, that could change.

Hearing Exhibit - 000438

Q Are you familiar with what we referred to as the quote, process within the process, end quote?

A Yes, sir.

Q Would this be part of perhaps a resolution of making a determination if the attachers could do their own loading analysis within that process?

MR. LANGLEY: I'm sorry, I lost you. Are you asking if there are provisions in the process within the process that allow a third party to perform its own engineering?

MR. SEIVER: Or at least to consider that.

THE WITNESS: I think over time, John, you know, the process says we will engage third-party attachers, and over time we could do that. Gulf, since it's in our initial learning about this process, needs to develop some experience with it.

BY MR. SEIVER:

Q All right. Well, would Gulf be willing to accept, perhaps, a loading analysis for overlashing that was confined to either a worst-case pole, or a certain number of poles if it's a straight line run, for example, where there is very similar poles in a row as opposed to a full loading analysis on every single pole?

A I don't think so at this time, John. You know, I believe we may get to that, but not right now. We just don't have enough experience.

Hearing Exhibit - 000439

Q All right. On Page 9 of your rebuttal testimony, the question at the top on Line 1 there, is a quote from Mr. Harrelson's testimony about giving notice 30 days after overlashing?

A Yes, sir.

Q And the question about seeing any problem with the proposal, your answer was yes, and that you had serious concerns whether you would ever actually receive notice with an after-the-fact notice requirement. And you say that because there is no incentive for FCTA or its member operators to self-report overload as it may create costs for upgrading the poles. Do you think that the cable operators have no interest in the pole lines being engineered to be safe, and adequate, and compliant with the NESC?

A No.

Q You have no data or evidence that you know of, do you, that would confirm that the FCTA or its member operators have not taken steps to keep poles from being overloaded when they overlash?

MR. LANGLEY: Object to the form.

A We have no prior experience with it, and have no idea what the volume is or what it is doing to our poles at this time.

Q And I think this is a follow-up, it's similar to what we talked about before, you've got no evidence that the

Hearing Exhibit - 000440

existing overlashed cables have put any particular pole into an overloaded situation?

A That's correct, I have no knowledge either way whether it did or did not.

Q And you have not -- and as far as your own knowledge, do you have any understanding whether Gulf has any information on cable operators overlashing creating an overloading situation on any particular pole in the Gulf service territory?

A No, sir, I do not.

Q Do you think that cable operators would try to avoid paying for upgrading a pole to support their overlashing?

A I do not know. With after-the-fact notification, John, if there is cost associated with it, the natural tendency might be to not report it.

Q But that is more of a fear rather than a basis that you have experience with?

A Yes, sir.

Q And as far as the next couple of lines where you are talking about even assuming you receive notice, it would allow unengineered loads to be placed on the poles, I think Mr. Harrelson, if you looked at the question above proposed not only a notice, but a 30 days after-the-fact loading analysis. So it is not your understanding that the cable operators are intending to put unengineered loads on the pole, are they?

MR. LANGLEY: John, are you asking him to look at

Hearing Exhibit - 000441

Mickey's testimony, some other part of Mickey's testimony?

MR. SEIVER: No, just the line and the question. The question is that Mr. Harrelson proposed 30 days after the fact loading analysis, and in the answer the fear is that there is going to be unengineered loads on the poles, despite the fact that we are proposing to do an after-the-fact notice with a loading analysis. I just want to understand why Mr. McDaniel said it would allow unengineered loads to be placed on the poles.

THE WITNESS: Well, not knowing when the load was placed on the pole, you know, when the overlashing was done, or when the engineering was done, there's no way for us to know when that weight and load was placed on the pole. What we want to assure is that both happen before any load is placed on the pole so any corrective action that needs to be taken can be taken.

BY MR. SEIVER:

Q Before the attachment is made?

A Yes, sir.

Q Or before the overlash. I guess my question would be, then, and I think I know what the answer is going to be because it is similar, because you need to have the experience with the loading analysis. But if the requirement was for the cable operators to give notice after, but based on an analysis that preceded the attachment, which analysis would have to show

Hearing Exhibit - 000442

that there would not be an overloaded situation, would that assuage your fears about the unengineered loads going onto the poles?

A Can you restate that sequence of events?

Q I'm sorry. I'm just trying to make sure that your fear of the cable operators is not based on the fact that they would either lie or fail to do what they agreed to do. That if the notice after the fact included a representation that the loading analysis was done before the attachment was made, would that be sufficient to ease your fears about unengineered loads going on the pole?

MR. LANGLEY: John, are we negotiating here?

A Not at this time, I think, for the previous reasons I have stated, John. You know, I'm just very uncomfortable without knowing what the expected results are of the engineering and not knowing about loads to go on the pole until we have looked at it and have some experience with that.

Q All right. I believe that Gulf is going to use Alpine like one or more of the other utilities to do the loading analysis, is that right?

A Yes, sir.

Q And also Pole Foreman, is that the software?

A Pole Foreman is the software that Gulf Power Company uses.

Q Okay. Would you be willing to include in the plan,

Hearing Exhibit - 000443

though, a shifting of the responsibility to the cable operators over a period of time that would allow you, after you have gotten your hands around the situation, allow the cable operators to perform the loading analysis, or perhaps even use Alpine?

And, no, I'm not trying to make this a negotiation, Eric, I'm just trying to find out so we know where we are for the hearing.

A Yes, sir, I believe we would be agreeable to that.

MR. SEIVER: Well, Mr. McDaniel, you have been very, very helpful. I appreciate your time, and that's all I have.

MS. BENNETT: Russell and Eric, this is Lisa Bennett with the Public Service Commission. May I have a couple of minutes for a few more follow-up questions?

MR. BADDERS: Absolutely.

MS. BENNETT: Thank you.

REDIRECT EXAMINATION

BY MS. BENNETT:

Q Mr. McDaniel, again, this is Lisa Bennett. In response to an earlier question that I had asked you, I believe you said that you received cost/benefit input from all third-party attachers in your service territory, and I may have needed to clarify that question a little bit better. Did you receive input from all individual cable operators in your service territory?

Hearing Exhibit - 000444

A I do not believe that we received it from all. We sent out a request to all of those in our service area, and we received responses from some of them.

Q Did you include the information you received in your plan that was filed with the Public Service Commission?

A Yes, ma'am.

Q Did FCTA file cost/benefit data with you?

A Yes, ma'am.

Q Was it filed with your plan?

A Yes, ma'am. What they provided was filed.

MS. BENNETT: Can we ask that that be subject to check?

THE WITNESS: Yes, ma'am.

MR. BADDERS: Lisa, are you asking him to check that right now?

MS. BENNETT: Yes, if you don't mind.

THE WITNESS: Okay. I'm looking at our plan, and I show under Section 12.3 estimated FCTA costs.

BY MS. BENNETT:

Q What were those?

A What they show was on Gulf's pole inspection program a three-year cost impact of $72,000. Then on Gulf's proposed extreme wind load project, a three-year cost impact of $45,000.

Q Okay, thank you. And I also believe you stated that you were conducting pole loading analysis as part of pole

Hearing Exhibit - 000445

inspections, is that correct? I'm sorry, you said you were not conducting pole loading analysis as part of the pole inspections?

A Yes, ma'am, that's correct, we are not.

Q Okay. And doesn't the Commission pole inspection process require loading analysis be done?

A Well, maybe it's in terminology. We have a ground line inspection program which is separate from what we put in our plan related to the pole strength and loading analysis. It is two separate parts. We are doing pole strength and loading, as we stated in the plan on the population of poles that are 20 years and older with three or more attachments. We are taking a 5 percent sample of that, which works out to approximately 500 poles per year for 2007, '08, and '09.

MS. BENNETT: That would be all the questions I have. Thank you, Mr. McDaniel. Thank you, gentlemen.

(The deposition concluded at 11:32 a.m.)

Hearing Exhibit - 000446

ERRATA SHEET

DO NOT WRITE ON TRANSCRIPT - ENTER CHANGES HERE

IN RE: DOCKET NO. 070297-EI, et al.
NAME: ALAN G. McDANIEL
DATE: September 20, 2007

PAGE	LINE	CHANGE

CERTIFICATE OF OATH

STATE OF FLORIDA

COUNTY OF ESCAMBIA

I, the undersigned authority, certify that Alan G. McDaniel personally appeared before me at the offices of Beggs & Lane, 501 Commendencia Street, Pensacola, Florida and was duly sworn by me to tell the truth.

WITNESS my hand and official seal in the City of Pensacola, County of Escambia, State of Florida, this 20th day of September, 2007.

Mary E Davis
Notary Public
State of Florida

Personally known ___ OR produced identification ✓.
Florida Dr. Lic.
Type of identification produced M235-007-58-063-0

MARY E DAVIS
Notary Public, State of Florida
My Comm. Expires Nov. 12, 2010
Comm. No. DD 613875

STATE OF FLORIDA)
: CERTIFICATE OF REPORTER
COUNTY OF LEON)

I, JANE FAUROT, Official FPSC Commission Reporter, do hereby certify that I was authorized to and did stenographically report the foregoing deposition at the time and place herein stated.

I FURTHER CERTIFY that this transcript, consisting of 53 pages, constitutes a true record of the testimony given by the witness.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 24th day of September, 2007.

JANE FAUROT, RPR
Chief, Hearing Reporter Services
Office of Commission Clerk
(850) 413-6732

Hearing Exhibit - 000449

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BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of:

REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY TAMPA ELECTRIC COMPANY.	DOCKET NO. 070297-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY PROGRESS ENERGY FLORIDA, INC.	DOCKET NO. 070298-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY GULF POWER COMPANY.	DOCKET NO. 070299-EI
REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342, F.A.C., SUBMITTED BY FLORIDA POWER & LIGHT COMPANY.	DOCKET NO. 070301-EI

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TELEPHONIC
DEPOSITION OF: EDWARD J. BATTAGLIA

TAKEN AT THE
INSTANCE OF: The Staff of the Florida Public Service Commission

FLORIDA PUBLIC SERVICE COMMISSION

PLACE:	Room 362 Gerald L. Gunter Building 2540 Shumard Oak Boulevard Tallahassee, Florida
TIME:	Commenced at 2:00 p.m. Concluded at 2:51 p.m.
DATE:	Thursday, September 20, 2007
REPORTED BY:	JANE FAUROT, RPR Official FPSC Reporter (850) 413-6732

FLORIDA PUBLIC SERVICE COMMISSION

APPEARANCES:

RUSSELL BADDERS, ESQUIRE, Beggs & Lane, P.O. Box 12950, Pensacola, Florida 32591 and ERIC LANGLEY, ESQUIRE, representing Gulf Power Company.

JOHN SEIVER, ESQUIRE, Davis Wright Tremaine LLP, 1919 Pennsylvania Ave., NW, Suite 200, Washington, D.C. 20006, appearing on behalf of Florida Cable Television Association.

LISA BENNETT, ESQUIRE, FPSC General Counsel's Office, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850, appearing on behalf of the Commission Staff.

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EXHIBITS

NUMBER:		ID.
1	(Late-filed) Incremental costs Associated with Gulf's Ten Point Initiatives	11

Hearing Exhibit - 000455

S T I P U L A T I O N

IT IS STIPULATED that this deposition was taken pursuant to notice in accordance with the applicable Florida Rules of Civil Procedure; that objections, except as to the form of the question, are reserved until hearing in this cause; and that reading and signing was not waived.

IT IS ALSO STIPULATED that any off-the-record conversations are with the consent of the deponent.

Hearing Exhibit - 000456

P R O C E E D I N G S

MS. BENNETT: I think if you all are ready, we are ready to start.

MR. BADDERS: Okay. What we will do, we will go ahead, we'll have the normal stipulations as far as objections. We would like to read and sign. And I guess we will go ahead and swear the witness in.

MS. BENNETT: Very good.

(Witness sworn by Notary Public.)

MR. BADDERS: And, again, we'll fax you a copy of that in just a few minutes, and then we will attach the original to the deposition after we read and signed it and return it.

MS. BENNETT: Okay.

EDWARD J. BATTAGLIA

was called as a witness and, after being duly sworn by the court reporter, testified as follows:

DIRECT EXAMINATION

BY MS. BENNETT:

Q Mr. Battaglia, my name is Lisa Bennett. Did I say your name correctly?

A Yes, you did, Lisa.

Q I am with the Public Service Commission. And at any time if I ask you a question that you are not quite sure of, just stop me and ask me to explain and I will try.

Hearing Exhibit - 000457

A Okay.

Q Mr. Battaglia, you filed -- well, first of all, let's start with your name and address?

A My name is Edward J. Battaglia, and my business address is One Energy Place, Pensacola, Florida 32520.

Q Thank you. And you filed testimony on behalf of Gulf in Docket Number 070299, correct?

A That is correct.

Q And the purpose of your testimony was to address Gulf's storm hardening plans for 2007 through 2009, is that correct?

A That is correct.

Q In addressing Gulf's storm hardening plan, you reviewed the ten-part initiatives approved by PSC Order Number 060781 and 060947, is that correct?

A That is correct.

Q Would you agree with me that the previously approved initiatives are mostly annual system-wide activities?

A That is correct.

Q What is Gulf's estimate as to the total incremental cost for the previously approved storm hardening initiatives for Gulf?

A If you refer to my attachment in Appendix 7 of the filed plan, for roughly 2007, 2008, and 2009, it's approximately $5 million in incremental cost.

Hearing Exhibit - 000458

Q Okay. Could you express the incremental cost for the previously approved storm hardening initiatives in terms of the rate impact on a residential customer per 1,000 kilowatt hours?

A In terms of the residential rate of 1,000 kilowatt hours, Gulf has calculated it to be approximately 28 cents.

Q And Gulf's proposed plan, the one that's subject to this docket, includes the ten-part initiative previously approved by the Commission, is that correct?

A Yes.

Q Would you agree that the proposed hardening plan in this docket is a three-year look ahead that is subject to change as more information is gathered and costs are refined?

A That is correct.

Q And would you agree with me that Gulf's previously approved ten-part initiative and the proposed hardening plan are complementary to each other?

A Yes, I do.

Q What is Gulf's estimate as to the total incremental cost for the proposed hardening plan?

A The total incremental cost per year for the amended storm hardening plan --

Q Yes, sir.

A -- again, is approximately $5 million per year.

Q Let me clarify something. The last question was the incremental costs for the previously approved ten-part

Hearing Exhibit - 000459

initiative, would that answer change?

A Oh, for just -- I stand corrected. For just the previously approved ten-part initiatives?

Q Yes, sir.

A Again, I'm doing it very quickly. As far as for the total incremental cost, including a wood pole inspection, again, we are looking at probably approximately $3 million per year. This includes, again, the wood pole inspection and the ten-part initiatives.

Q And could you express that as a rate impact per 1,000 kilowatt hours for residential customers?

A No, I cannot, but we can do a calculation based on just that part that I'm aware of. What I have seen up to this point is the total incremental cost for the plan. And, again, when I stated the 28 cents, that was for the total three years of the plan versus a per year.

Q Does the 28 cents include -- or the $5 million include the ten-part initiative?

A Yes, it does.

Q I'm wondering if I can get a late-filed exhibit that would show the ten-part initiative rate impact per kilowatt hour for residential customers separately from the 28 cents per 1,000 kilowatt hours that you testified to?

A I see no problem with doing that.

MR. BADDERS: Lisa, this is Russell. I believe we

Hearing Exhibit - 000460

have some outstanding discovery that may address that also, so we will try to get that to you also fairly quickly.

MS. BENNETT: Okay.

(Late-filed Exhibit 1 marked for identification.)

BY MS. BENNETT:

Q And so the 28 cents per 1,000 kilowatt hour rate impact, that is for the entire storm hardening plan which includes the ten-part initiative, am I understanding your answer correctly?

A That is correct.

Q Would you agree that Gulf is responsible for pursuing the most cost-effective storm hardening projects?

A Yes, I would.

Q And would you agree that the Public Service Commission expects each utility to prudently manage its resources?

A Yes, I would.

Q Okay. For this next set of questions, I am going to ask you to turn to Schedule 4 of your Exhibit EJB-1. Let me know when you're there.

A I'm there.

Q Okay. First, I would like you to just briefly describe this schedule for me?

A Okay. This schedule that you are looking at here represents the total cost for our storm hardening plan, so this

Hearing Exhibit - 000461

is different from the incremental cost sheet that you have seen as the second sheet in the amended plan. And so, for example, if you look at the three-year vegetation management cycle from what we show for the years 2007 through 2009, again, that represents the total cost of our vegetation management plan, as an example.

Q Okay. I'm going to ask you some specific questions in reference to this schedule. There are three column headings that bear the title "Impact on Storm Restoration Costs." Do you see those?

A Yes.

Q Are the costs that appear in those columns Gulf's estimate of reductions in storm restoration costs?

A That is correct.

Q And that's assuming the storm hardening plan is implemented?

A That's correct.

Q To the left of that set of three columns, there are six columns that bear the title "Actual/Estimated Utility Costs." Do you see that?

A Tell me one more time, please.

Q To the left of the Impact on Storm Restoration Costs there is a set of, I believe, six columns with a heading called "Actual/Estimated Utility Costs"?

A Yes, I see that now.

Hearing Exhibit - 000462

Q Would these represent the costs Gulf has incurred or is projecting to incur to derive the estimated reduction in storm restoration costs?

A In this particular case, as far as forming a basis for some of the calculations, I believe that would be correct.

Q And then I'm going to ask you to look at Lines L and M on this schedule.

A Yes.

Q Would you agree with me that in comparing the utility's costs to the estimated reduction in storm restoration that you see on Lines L and M, would you agree that the utility's costs are less than the estimated reduction in storm restoration costs?

A Yes, they are.

Q Would you call that type of a comparison that we just made a benefit-to-cost ratio?

A Yes, I would.

Q When Gulf incurs storm restoration costs, it charges those costs against its storm reserve, doesn't it?

A Correct.

Q And is Gulf's storm damage reserve a component of Gulf's base rate?

A I'm not that familiar as far as how that's calculated.

Q Who at Gulf would be familiar with that?

Hearing Exhibit - 000463

A I would have to look for somebody within our financial area to help us with that.

Q Would you agree that the base rates are where the storm reserve come from?

A Again, I'm not that familiar with the process.

Q Okay. I'm going to ask you this question, you may not be able to answer it either, but let's try it. If the storm hardening plans filed by Gulf are successful, would you expect a reduction in the storm reserve component for Gulf?

A Again, I'm not familiar enough with the process to say so.

Q Based on the analysis represented by Schedule 4, Gulf's proposed hardening plan is cost-effective, do you agree?

A To some degree. You really have to define cost-effective.

Q Well, to what degree do you believe it is cost-effective?

A I believe there are certain components that we have looked at that have that potential to be cost-effective. One example of that would be, say, in our vegetation management plan, what we have proposed as far as the danger tree removal for distribution, and that's based on what we currently have estimated.

Q Can you give me another component that would be cost-effective?

Hearing Exhibit - 000464

A Beyond that, that's the only one that really leaps to mind for me.

Q Is there any that leap to mind that is not cost-effective, in your opinion?

A Again, the reason I'm saying this is because it has yet to be proven out as far as we go forward in looking at the results of these initiatives to really make a full determination.

Q So I think what you're telling me is that you know about the vegetation plan being cost-effective because Gulf has actually seen the results, is that correct?

A Not entirely correct. And the reason I'm saying that is because in that particular case, the analysis done -- again, an example of the danger tree removal and all, based on what I have seen from our forestry services folks, indicate that that one has a high potential to be cost-effective. But, again, even in that particular case, the final determination cannot be determined until we go forward and see the results of how it performs.

Q I'm going to ask for this next question for you to look at Line Items A, and also C through K. And based on those line items, is it your understanding that Gulf previously filed its plans addressing these line items with the Commission?

A Yes.

Q And would you agree with me that the Commission

Hearing Exhibit - 000465

approved the implementation of Gulf's plans for items in Line A and C through K?

A Yes.

Q In the prior proceedings, did the Commission find that Gulf's plan, if implemented, was reasonably expected to achieve reduced storm restoration costs and reduced outages to affected parties?

A I believe that was the case.

Q In those proceedings, in those prior proceedings in which Line Items A and C through K were addressed, did the Commission or Gulf use a benefit-to-cost ratio to determine the cost-effectiveness of Gulf's plan for each line item?

A Not that I'm aware of.

Q Okay. Would you agree with me that the Commission's overarching objective of Rule 25-6.032 is to promote a corporate culture that reduces storm restoration costs and storm-caused outages to affected parties?

A Yes.

Q Could you please describe Gulf Power's efforts to provide -- we are off of Schedule 4, now. Would you describe Gulf Power's efforts to provide joint use and third-party attachers additional detailed information necessary to complete cost/benefit estimates for 2007 through 2009 since the time of your filing of storm hardening plan?

A I am not familiar with that part of the plan. That

Hearing Exhibit - 000466

was handled by Mr. McDaniel.

Q Are you familiar at all with any of the third-party attacher agreements?

A No, I am not.

Q Okay.

MS. BENNETT: Bear with me for just a moment.

Mr. Battaglia, I have good news, I'm finished with my questions.

THE WITNESS: Thank you.

MR. SEIVER: All right. This is John Seiver. We have been going about 20 minutes, so should we just keep going?

MR. BADDERS: Yes, I think that would be a great idea.

MR. SEIVER: Okay.

CROSS EXAMINATION

BY MR. SEIVER:

Q Good afternoon, Mr. Battaglia. My name is John Seiver. I am a co-counsel for the Florida Cable Telecommunications Association, or the FCTA. How are you today?

A Just fine. Good afternoon, John.

Q I'm going to ask you questions mostly from your regular testimony, the initial testimony, I'm sorry, that you filed on August 24th. And I might go into a couple of areas or at least one area where I think Mr. McDaniel said you might

Hearing Exhibit - 000467

have more understanding than he did. The first thing I want to ask you is on Page 9 of your initial testimony, do you have that handy?

A Yes, I do.

Q Starting at around Line 19 or so, going to the bottom, there is a discussion of Gulf's experience with underground distribution, and you conclude that it is does not support using it as a storm hardening activity. Do you see that?

A Yes, sir. And this is on Page 9?

Q Yes.

A Okay. Yes, I do.

Q And there is a conclusion going from Page 9 onto Page 10 that with the underground construction there is not only increased costs both with the initial installation, normal operation and maintenance, but then you carry on that it might have longer outages because it is going to take longer to find and make the repairs, is that right?

A Yes, sir.

Q So just so I understand, one of the things you were looking for when you were trying to come up with your storm hardening plan is something that would not cost an additional amount and/or delay repairs with respect to storm damage to the plant, is that right?

A Yes, we were.

Hearing Exhibit - 000468

Q On Page 10 as you moved down, and we discussed some of this with Mr. McDaniel, there was a decision to move from Grade C to Grade B construction. Do you see where you talk about that down there at Line 20, I guess, 21, 22?

A Yes, I do.

Q You also go on to Page 11 talking about the different ways of moving to Grade B, and you list a number of considerations besides using just a stronger class of pole, and including stronger anchoring and guying. Are you referring to traditional guying, storm guying, or both?

A Both.

Q And do you also consider the lateral effects of the conductors that are on the pole as having a guying effect, as well?

A No, we do not.

Q Do you understand the concept of the lateral guying effect of the conductors?

A I understand it to a certain degree as far as what has been discussed up to this point.

Q Do you agree that that would be another method of determining the ability of a particular pole line to achieve Grade B status?

A That is not possible to say at this time until I see a methodology for entering it into the overall calculation, and basically how it will work with the existing NESC rules and

Hearing Exhibit - 000469

existing methodologies for doing those calculations.

Q You are using Pole Foreman for making those calculations?

A Yes, we are.

Q And, to your knowledge, does Pole Foreman have -- I don't know, a screen or a data entry point where lateral guying effects could be entered?

A And, again, clarifying, are you talking about being able to enter in the fact that there is a termination on the pole and the associated down guying anchor with it?

Q Well, I am assuming that that part was already in there. I was thinking more of the lateral guying effect of the conductors between the poles?

A I do not believe that is part of the methodology that is used in Pole Foreman.

Q Do you know whether it could be adapted to be part of Pole Foreman?

A I do not know that.

Q Have you used Pole Foreman yourself personally?

A To a limited degree.

Q Are there other people within Gulf that are more experienced with using it than you are?

A That is correct.

Q But your understanding is that it is an industry recognized application for calculating loading on a pole?

Hearing Exhibit - 000470

A That's what I understand.

Q On the Pole Foreman analysis, have you used it or been aware of its use with respect to overlashing of additional conductors, communications conductors on poles?

A I have not.

Q Do you know if there is a provision within the Pole Foreman -- and forgive me if I'm saying it wrong -- the data entry or screens where additional overlashed communications cables could be entered for purposes of determining the loading of a particular pole?

A With my limited understanding of Pole Foreman and using it, again, on a limited basis, I don't believe Pole Foreman distinguishes between attachments and whether or not there is an overlash attachment versus it's looking at the number of attachments and the sizes of those attachments based on the different types of cable that may be there. But I'm not aware of where it distinguishes between those as far as saying that one part of it is overlashed.

Q And Pole Foreman to your understanding -- and, again, I'm just asking you for your understanding and nothing more than that, so I don't need you to speculate or guess what other people might know, but to your understanding does Pole Foreman take into account the location on the pole of the conductors that are being assessed for purposes of loading such that conductors, heavier or more conductors higher up on the pole

Hearing Exhibit - 000471

have a different loading effect than conductors lower on the pole?

A Pole Foreman takes into account the measurements of the conductors taken whether they are power attachments or third-party attachments.

Q And that would include other equipment, such as transformers, and fuses, and other types of equipment for the power distribution part of the pole?

A Yes, it does.

Q Have you modeled -- I mean, have you been present when a particular pole has been analyzed under Pole Foreman just to see how it works?

A Yes, I have.

Q Has that pole or poles that you have looked at had communications conductors of the cable operators on them?

A Yes, some of them did.

Q Do you know if some of them also had the strand and coaxial cable plus one or more overlashed fiber optic cables?

A I don't remember to that detail.

Q Had any of the poles that you looked at or that you looked at with Pole Foreman doing the analysis fail in the loading testing?

A Yes, some of them did.

Q And did they fail Grade C, or Grade B, or something else?

Hearing Exhibit - 000472

A The ones that I have been involved with were modeling using Grade B and then also looking at extreme wind loading.

Q You are only applying extreme wind loading for your CIF projects, isn't that right?

A That's correct.

Q And that would include some of the feeders, as well?

A That is correct.

Q As far as Grade B is concerned for the rest of the plant, we have talked to Mr. McDaniel about it, if a pole was built under your old Grade C standard, and it was doing fine under that standard, but did not meet Grade B, but was still an adequate pole under Grade C, you are not planning to change that pole out, are you?

A That's correct.

Q On the failing, or the poles that you looked at that failed to meet Grade B, do you recall did they all at least meet Grade C?

A Yes, they did.

Q And could you tell from looking at those poles what would have been required to bring them up to Grade B, if that was what you were going to do?

A Under our process and all it requires going ahead and basically trying out different options in order to bring it up to Grade B. For example, if it did not meet the loading requirements, we would first look at what additional guying

Hearing Exhibit - 000473

could we do and would that bring it up, and so methodically work our way through that type of process.

Q And that would be the traditional down guys as well as, you know, maybe storm guys, is that right?

A To a certain degree. In some cases the guying does require heavier duty anchors than what you would normally use under, say, just typical C type construction.

Q And were there situations where you thought that placing an intermediate pole rather than changing out the existing pole would be the best way to go?

A If you're talking about what few examples that I have been involved in --

Q Yes.

A -- the basis of the additional guying and then changing it out, perhaps, because it was just a class size, it seemed appropriate to do.

Q So that would just be replacing -- at the same location putting in a Class 2 pole, for example, instead of an existing Class 3 or 4?

A That's correct.

Q Did that also include going to a taller pole? Is there any situation where you would be doing that, as well, or would that not be necessary for purposes of becoming Grade B?

A That typically would not be necessary.

Q As far as the poles that are Grade B within your

Hearing Exhibit - 000474

system, and I think you said some are Grade B already, and some are Grade C, and maybe others are failing it, do you have an understanding or an estimate of what percentage of the plant is already at Grade B?

A No, I do not.

Q Do you have a sense that, you know, it's something as much as half of the plant, or is it impossible to --

A I haven't done that determination.

Q And the poles that you saw, I guess, were not a random sampling, so that wouldn't be a good way to try to estimate what is Grade B and what is Grade C?

A No, I don't believe so, that that would be a good basis to try to do that.

Q In your testimony you also mentioned on Page 12, going on to Page 13, that Grade C and equivalent wind and, I guess, Grade B and equivalent wind, I just wanted to ask you are the 60-mile an hour wind design and the equivalent wind of 83 for Grade C, where did you get those numbers from?

A Those are bases as far as the factors from the National Electrical Safety Code as far as trying to go ahead and estimate as far as what would be the equivalent wind of that type construction.

Q On a typical Grade C construction, you said?

A Yes.

Q And that would include a pole -- not just a bare

Hearing Exhibit - 000475

pole, but a pole with conductors and facilities on it?

A That's what I understood.

Q On Page 13 there is a reference to three-phase feeders and laterals can have an effective wind load up to 95. Now, where did that come from?

A Again, on some of that, if I recall correctly, that was based on the sum of our experience and also what we learned from some of the workshops that the Public Service Commission conducted in the past few months.

Q Well, I guess I was just wanting to make sure that those particular poles can have an effective wind load. Did you mean they can withstand winds up to 95 miles an hour or that they might, you know, be subject to those types of forces?

A Again, as I understood and all as far as that, they could withstand up to those types of forces.

Q I see. And this is still with Grade C, is that correct?

A Again, to make sure that I'm looking at the correct line, which line are you looking at?

Q Well, I have been going back and forth between Page 12, starting at Line 24, going on to Page 13, Lines 1 and 2?

A Give me a second just to, again, refresh my memory on that.

Q Of course.

MR. SEIVER: Russell, just so I'm clear, what is the

Hearing Exhibit - 000476

question?

MR. BADDERS: I want to understand in that sentence at the top of Page 13, starting in Line 1 and going to 2, that if he is still talking about Grade C construction for these three-phase feeders and laterals that have an effective wind load up to 95 miles an hour, I wanted to know where that came from, as well?

A I believe that is correct.

Q That is for the Grade C?

A Yes, I believe that is correct.

Q And you concluded that your system, then, is well matched with the most likely storms. Is that based on the fact that nearly 50 percent of the storms have been Category 1?

A Based on historical storm information, that's correct.

Q Did you or anyone within Gulf make any meteorological predictions as to future storms and their strength and categories?

A No, not that I'm aware of.

Q So you don't have an expectation that you will have a Category 3 storm in the next three years?

A I'm praying that that will not happen.

Q And Category 3 is the highest speed storm that you have experienced?

A Based on historical information as far as Category

Hearing Exhibit - 000477

3 hurricanes, that is correct.

Q Now, moving from 95 miles per hour, in the next sentence you say for Grade B you are moving up to -- that would be an equivalent wind load of 118?

A That is correct.

Q And that is from the NESC, as well?

A That is correct.

Q And your conclusion is that then you will be able to sustain approximately 80 percent of the storms in Line 9?

A Based on historical storm information, that is correct.

Q If you look at your Exhibit EJB-1, Schedule 9, there is a listing in your testimony of the direct hits to northwest Florida?

A Yes.

Q Did you make a determination because Category 3 would be 100 percent, that some of the storms within Category 3 would not be addressed because that range is 111 to 130?

A And, again, I apologize, but repeat the question.

Q I'm sorry. I'm just trying to understand, if you built to 118 miles per hour, you're going to get some of the Category 3 storms, but maybe not all of them because that can go up to 130?

A That is correct.

Q Do you have an understanding about this equivalent

Hearing Exhibit - 000478

wind load of 118 miles per hour, for example, if there is a margin -- and I don't want to call it error, but a margin for additional wind that if you build it to 118 miles per hour it could actually withstand gusts of more than that?

A I'm not entirely familiar with that.

Q Do you know if there is a separate analysis for three second gusts?

A I believe so.

Q But you don't know what that higher wind speed might be for withstanding gusts?

A No, I do not.

Q Staying on Page 13 going to Line 10, you mention that Gulf's field experience strongly indicates that pole failures on its distribution system are not the result of the wind itself during a hurricane, but rather the wind-carried debris and off-right-of-way trees. Let me ask you, have you looked at any of the other investor-owned utilities damage profiles in this docket?

A I am only really familiar with Gulf's.

Q And is there a compilation of damage or any forensic analysis that has been done of the damage during the hurricanes to indicate whether it was a flying toolshed or a falling tree that broke any pole?

A Again, I'll ask you to clarify that. You are speaking of Gulf?

Hearing Exhibit - 000479

Q Yes, just Gulf.

A And, again, as far as whether Gulf did any kind of forensic analysis, a formal forensic analysis?

Q Yes.

A Gulf has not done a formal forensic analysis of past storms.

Q But your understanding is from your experience or from talking to other people within Gulf that wind-carried debris and off-right-of-way trees rather than wind alone caused the pole failures?

A That is correct.

Q And would it be fair to say that pole failures due to debris and right-of-way trees will not necessarily be prevented by either using a higher grade construction or even extreme wind?

A That is correct.

Q In the next sentence you said despite this -- and I presume that's meaning despite the conclusion that we just discussed that it still might come down with debris and trees, it is reasonable to adopt Grade B for cost-effectiveness and the potential for positive storm hardening benefits. What is the cost-effectiveness, in your mind, that you are referring to there in Line 14?

A In that particular line as far as cost-effectiveness, as far as a reasonable option for storm hardening going

Hearing Exhibit - 000480

forward, based as far as what we see as far as the cost impact to the company to try to implement it. So, again, to clarify that, even with the transitioning to Grade B construction, Gulf still is saying that it needs to be field tested. That, again, the evaluation of it needs to be done to see whether or not it really holds promise as far as reduced costs in storm restoration.

Q And you do say further down that you will continue to evaluate. Would you think that a CIF project or maybe limited theaters as opposed to all new construction would make it more sensible at Grade B to make the evaluation?

A For Gulf's proposed plan, what we propose is what we think is a reasonable thing to try to do at this point.

Q On the aspect of the pole lines being susceptible to extreme wind, had you done any analysis of differentials in pole failures in open areas versus areas where the lines might be closer to trees?

A No, I have not.

Q Did you look at the different wind zones that might apply in coastal areas versus more inland areas of your service area?

A Gulf has looked at -- basically, Gulf has looked at the table which was referred to, I believe, in the rules concerning extreme wind loading that basically shows the wind speeds for Gulf's area, and that is what we have been applying.

Hearing Exhibit - 000481

Q And part of your storm hardening project also includes vegetation trimming and tree trimming and things like that?

A That's correct.

Q And do you see that as a critical part of the overall success of the storm hardening plan?

A Yes, I do.

Q On Page 14 of your testimony, Mr. Battaglia, and I apologize, I sometimes say Battaglia, because I had a teacher in school whose name was spelled just like yours, but it was pronounced Battaglia.

A It's pronounced both ways.

Q But on Page 14, Mr. Battaglia, it says Gulf proposes to adopt EWL standards for main feeder distribution systems that serve the CIS. Is this something that you are going to do through 2009 and do it as part of the cost of a storm hardening plan at Gulf's expense, or is this something, an expense that will be shared with attachers that may be on those same poles that are being hardened to extreme wind, if you know?

A You are really getting into Mr. McDaniel's area. For what my intent is on a storm hardening plan that, again, we are looking at taking those critical infrastructure feeders and apply extreme wind loading, and that's the part of the engineering that my team will be involved in. And as far as what evolves out of that affecting third-party attachers, that

Hearing Exhibit - 000482

would be something that you would need to refer to Mr. McDaniel.

Q On Page 15 there is a discussion about why Gulf did not adopt extreme wind as a standard for all existing overhead distribution facilities, and the first part of your answer is that it was not cost-effective to do so. You did evaluate it, then, to come to the determination that it would not be cost-effective?

A That is correct, as far as looking at the overall cost impact.

Q And that is a multiple -- the cost impact is a multiple of what it would be to go to just Grade B?

A I don't know if I could say that, that it would be just simply a multiple. I don't know.

Q I am just looking at the total being 437 million. Is that an incremental cost that we can compare with the incremental costs you were talking about with Ms. Bennett?

A Let me make sure I understand. You're saying as far as looking into incremental cost of Grade B, whatever that is, versus this particular cost as far as incremental costs are going to extreme wind loading?

Q That's correct. I just wanted to know if I'm comparing 15 million with 437 million, because I was using 5 million a year as your total incremental cost for the Grade B, and all of the aspects of your storm hardening plan,

Hearing Exhibit - 000483

actually, I guess, versus going to extreme wind.

A I am not entirely clear on that. I'm not sure.

Q All right. And one of the reasons that you determined was not cost-effective is that you didn't believe that poles hardened to extreme wind would perform any better in the circumstances that you described of trees and debris through the air bringing poles down?

A That's correct.

Q And, again, at the bottom of Page 15 you do make the point that Gulf's experience there in Line 23 is that wind-blown debris is the predominant cause of damage versus pure wind?

A That is correct.

Q And so that building to extreme wind would not prevent that type of damage?

A That is correct.

MR. SEIVER: If you will give me a moment, Mr. Battaglia. It will take just a second.

(Off the record.)

MR. SEIVER: All right. If you are ready I have just a few more questions.

THE WITNESS: Yes, sir.

BY MR. SEIVER:

Q When you engineered your pole lines at Grade B, will they be engineered so they could handle third-party

Hearing Exhibit - 000484

attachments, or will third-party attachers need to apply and do a loading analysis before they can put their lines on any new Grade B pole?

A I would have to defer that to Mr. McDaniel.

Q All right. And as far as overlashing is concerned, that's, again, you know, whether an existing attachment could be overlashed, that would be something within Mr. McDaniel's purview, is that right?

A Correct.

Q Do you have any knowledge or understanding of -- other than the storm damage, the damage to poles in Gulf's service territory?

A Would you please restate that?

Q Well, let me ask you this way. There was a response to the City of Panama Beach, Florida's interrogatories filed by Gulf, and there was a list of overhead line contact accidents, whether claims were filed or not, and I didn't know if that was an area that you would be familiar with, the listing of accidents?

A No, it is not.

Q So you would have no knowledge yourself of whether any particular pole in Gulf's service area was overloaded and caused an accident as a result of any third-party attachers facility or overlash facility, is that right?

A No, I do not.

Hearing Exhibit - 000485

Q You don't have that information?

A I do not have that information.

Q And you are not aware of that being something discussed by others in the company?

A No.

MR. SEIVER: All right. Well, thank you very much, Mr. Battaglia. That's all I have.

THE WITNESS: Thank you, sir.

MR. BADDERS: Lisa, did you have any other further questions?

MS. BENNETT: No. Thank you.

MR. BADDERS: I don't have any redirect. I appreciate it.

(The deposition concluded at 2:51 p.m.)

Hearing Exhibit - 000486

ERRATA SHEET

DO NOT WRITE ON TRANSCRIPT - ENTER CHANGES HERE

IN RE: DOCKET NO. 070297-EI, et al.
NAME: EDWARD J. BATTAGLIA
DATE: September 20, 2007

PAGE	LINE	CHANGE

Under penalties of perjury, I declare that I have read my deposition and that it is true and correct subject to any changes in form or substance entered here.

DATE _____ WITNESS NAME _____

FLORIDA PUBLIC SERVICE COMMISSION

CERTIFICATE OF OATH

STATE OF FLORIDA

COUNTY OF ESCAMBIA

I, the undersigned authority, certify that Edward J. Battaglia personally appeared before me at the offices of Beggs & Lane, 501 Commendencia Street, Pensacola, Florida and was duly sworn by me to tell the truth.

WITNESS my hand and official seal in the City of Pensacola, County of Escambia, State of Florida, this 20th day of September, 2007.

Notary Public
State of Florida

Personally known ___ OR produced identification ✓.

Type of identification produced Fl. Dr. Lic. B324-230-50-339-0

MARY E. DAVIS
Notary Public, State of Florida
My Comm. Expires Nov. 12, 2010
Comm. No. DD 613675

STATE OF FLORIDA)
: CERTIFICATE OF REPORTER
COUNTY OF LEON)

I, JANE FAUROT, Official FPSC Commission Reporter, do hereby certify that I was authorized to and did stenographically report the foregoing deposition at the time and place herein stated.

I FURTHER CERTIFY that this transcript, consisting of 36 pages, constitutes a true record of the testimony given by the witness.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED THIS 24th day of September, 2007.

JANE FAUROT, RPR
Chief, Hearing Reporter Services
Office of Commission Clerk
(850) 413-6732

Hearing Exhibit - 000489

Gulf Power Company
Calculation of Estimated Revenue Requirements and Rate Impact of Incremental Costs for Gulf's Three Year Storm Hardening Plan
2007 through 2009

	Jurisdictional Revenue Requirements Including Revenue Taxes				Rate Impact 1,000 kWh Residential Bill (Based on kWh Sales Projected for the Period 2007-2009)
	2007	2008	2009	Total	
a) Wooden Pole Inspections	$ 397,321	$ 486,339	$ 554,075	$1,437,735	$0.05
b) Ten Storm Hardening Initiatives	1,650,236	1,831,322	1,995,421	5,476,979	$0.19
c) Compliance NESC Extreme Wind Loading Standards	227,928	390,839	451,606	1,070,373	$0.03
d) Mitigating flood and storm surge damage to UG and supporting OH facilities	See Note 1			-	$0.00
e) Placement of new and replacement distr facilities to facilitate safe and efficient access for installation and maintenance	See Note 2			-	$0.00
f) Other Distribution Hardening Activities	96,491	96,491	96,491	289,473	$0.01
TOTAL	$ 2,371,976	$ 2,804,991	$ 3,097,593	$8,274,560	$0.28

Note 1 Incremental costs for this sub-component of Gulf's Plan for pilot underground projects and the use of stainless steel (SS) transformers were not included in the revenue requirement calculation. The cost of the pilot underground projects will be borne by the customer, and the cost of the SS transformers has already been included in Gulf's capital forecast since Gulf has historically installed SS transformers due to their effectiveness in resisting weather and reducing customer interruptions.

Note 2 Gulf has always recognized that accessibility to distribution facilities is essential to safe and efficient maintenance and storm restoration. Since this activity is already integral to our construction practices, there is no incremental cost impact.

Note 3 Item (f) includes feeder patrol costs as shown in page 2 of Appendix 7 in the Amended Storm Hardening Plan

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Deposition by FPSC Staff
Witness: Battaglia
Late Filed Exhibit No. 1
Page 1 of 1

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EXHIBIT NO. _____

DOCKET NO: 070301-EI - FLORIDA POWER & LIGHT COMPANY

WITNESS: VARIOUS

DESCRIPTION: STAFF'S COMPOSITE EXHIBITS - 5

DOCUMENTS:

1) FPL's Response to Staff's First Set of Interrogatories (Nos. 1-51)
2) FPL's Response to Staff's Second Set of Interrogatories (Nos. 52-57)
3) FPL's Response to Staff's First Request for Production of Documents (No. 1)
4) Deposition Transcript of Manuel B. Miranda (including errata sheet)
5) Late-Filed Deposition Exhibit Nos. 1, 2, 3 to the Deposition of Manuel B. Miranda
6) Deposition Transcript of John McEvoy (including errata sheet)

PROFFERED BY: STAFF

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI **EXHIBIT** 5
COMPANY FL PSC Staff
WITNESS Staff's Composite Exhibit-5
DATE 10/02 & 03/07 Stipulated

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company.	))))	**Docket No.: 070301-EI** **Served: August 13, 2007**

FLORIDA POWER & LIGHT COMPANY'S OBJECTIONS AND RESPONSE TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1-51)

Florida Power & Light Company ("FPL") submits the following Objections and Responses to Staff's First Set of Interrogatories (Nos. 1-51).

I. General Objections

FPL objects to each and every discovery request, to the extent it calls for information protected by the attorney-client privilege, the work product doctrine, the accountant-client privilege, the trade secret privilege, or any other applicable privilege or protection afforded by law, whether such privilege or protection appears at the time response is first made or is later determined to be applicable for any reason. FPL in no way intends to waive any such privilege or protection. The nature of the any such document(s) will be described in a privilege log filed/prepared by FPL.

FPL objects to providing information that is proprietary, confidential business information without provisions in place to protect the confidentiality of the information. FPL in no way intends to waive claims of confidentiality.

FPL objects to each discovery request and any instructions that purport to expand FPL's obligations under applicable law.

Hearing Exhibit - 000492

FPL is a large corporation with employees located in many different locations. In the course of its business, FPL creates numerous documents that are not subject to Florida Public Service Commission or other governmental record retention requirements. These documents are kept in numerous locations and frequently are moved from site to site as employees change jobs or as business is reorganized. Therefore, it is possible that not every relevant document may have been consulted in developing FPL's responses to the discovery requests. Rather, these responses provide all the information that FPL obtained after a reasonable and diligent search conducted in connection with these discovery requests. To the extent that the discovery requests propose to require more, FPL objects on the grounds that compliance would impose an undue burden or expense on FPL.

FPL objects to each discovery request to the extent that it seeks information that is not relevant to the subject matter of this docket and is not reasonably calculated to lead to the discovery of admissible evidence.

FPL objects to each and every discovery request to the extent it is vague, ambiguous overly broad, imprecise, or utilizes terms that are subject to multiple interpretations but are not properly defined or explained for purposes of such discovery requests.

FPL expressly reserves and does not waive any and all objections it may have to the admissibility, authenticity or relevancy of the information provided in its responses to Staff's discovery requests.

Hearing Exhibit - 000493

II. Response

Attached hereto are FPL's answers to Staff's First Set of Interrogatories (Nos. 1-51) consistent with its prior objections, together with the affidavit(s) of the person(s) providing said answers.

Respectfully submitted this 13th day of August, 2007.

John T. Butler, Esq.
Senior Attorney
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408
Telephone: (561) 304-5639
Facsimile: (561) 691-7135

By: /s/ John T. Butler
John T. Butler
Fla. Bar No. 283479

CERTIFICATE OF SERVICE
Docket No. 070301-EI

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by electronic delivery on the 13th day of August, 2007, to the following:

Lorena Holley, Esq. Division of Legal Services Florida Public Service Commission 2540 Shumard Oak Blvd. Tallahassee, Florida 32399-0850	Charles J. Beck, Esq. Office of Public Counsel c/o The Florida Legislature 111 West Madison Street, Room 812 Tallahassee, Florida 32399
Beth Keating Ackerman Law Firm 106 E. College Ave., Suite 1200 Tallahassee, FL 32301 (FCTA)	AT&T Florida J.Meza/E. Edenfield/J. Kay c/o Ms. Nancy H. Sims 150 South Monroe Street, Suite 400 Tallahassee, FL 32301-1556
Davis Law Firm Maria T. Browne 1919 Pennsylvania Ave., N.W., Suite 200 Washington, DC 20006 (FCTA)	Embarq Florida, Inc. Susan S. Masterson Mail Stop: FLTLHO0102 1313 Blair Stone Rd. Tallahassee, FL 32301
Verizon Florida LLC Dulaney L. O'Roark, III 6 Concourse Parkway, Suite 600 Atlanta, GA 30328	Young Law Firm R. Scheffel Wright/John LaVia 225 S. Adams Street, Suite 200 Tallahassee, FL 32301 (MUUC, Town of Jupiter Island, Town of Palm Beach)

By: /s/ John T. Butler
John T. Butler
Fla. Bar No. 283479

Q.

Compliance with National Electric Safety Code (NESC)

In its Plan, FPL asserts that its construction standards meet or exceed the National Electrical Safety Code (NESC). How has FPL verified that, at minimum, it has complied with the 2007 NESC?

A.

FPL construction standards are developed and documented in its Distribution Construction Standards (DCS) and Distribution Engineering Reference Manual (DERM). The DCS and DERM, developed by FPL engineers with extensive electric industry experience and understanding of the NESC, utilize and illustrate the calculations necessary to adhere to NESC Grade B construction standards. FPL's addendums to the DCS and DERM, included in FPL's May 7 filing, include EWL standards that exceed NESC Grade B construction. FPL's compliance was also supported by the KEMA, Inc. report issued in January 2006. This report, filed in Docket No. 060038-EI, concluded that FPL's standards as described in the DERM, met or exceeded the requirements of the NESC. Also, adherence to the NESC is subject to PSC audits, which are performed on an on-going basis.

Q.

Extreme wind loading standards

Please provide a list of each proposed change to FPL's current construction standards, policies, practices and procedures contained its the Storm Hardening Plan.

A.

In summary, FPL's Plan contains its 3 prong approach - EWL, Incremental Hardening and revised Design Guidelines. To support this 3 prong approach, FPL has developed a hardening design "tool kit". This toolkit is described in the addendum to the Design Guidelines, Distribution Construction Standards and the Engineering Reference Manual previously filed on 5/7/07, as attachments to FPL's Storm Hardening Plan. Generally, the hardening measures contained in the tool kit fall into the following categories:

- New standards for storm guying
- Guidelines for installation of intermediate poles to shorten span lengths
- Guidelines for replacement of poles with stronger wood or concrete poles
- Guidelines for undergrounding

Q.

Extreme wind loading standards

For each proposed change listed in response to Interrogatory No. 2, please state the scope of each proposed change, the cost of each change, the corresponding effect of reduced storm restoration costs and outage times, and how cost-effectiveness is determined.

A.

Each of the items listed in Interrogatory No. 2 are incorporated within each of FPL's three prong approaches.

Below are cost ranges for some of the hardening methods from FPL's design kit:

- Storm guying: $400 - $600 per pole
- Pole reinforcement/ET trusses: $1000 - $1500 per pole
- Installation of an intermediate wood pole: $2500 - $4000
- Replacement of a pole with a stronger wood pole: $3500 - $7000
- Replacement of a pole with a stronger concrete pole: $7000 - $12,000
- Undergrounding: $500,000 - $4,000,000 per mile

The reduced storm restoration costs and outage times of each have not been determined at this time. See FPL's response to Interrogatory No. 38 for benefits and cost-effectiveness. FPL continues to investigate and evaluate new materials, equipment and work methods to improve our effectiveness and efficiencies.

Q.

Extreme wind loading standards

For each prong in FPL's three-prong plan, please provide a specific description, on an annual basis, of all overhead distribution facilities subject to EWL hardening.

A.

According to FPL's Storm Hardening Plan, EWL hardening will be applied to 2 of the 3 prongs.

EWL - In 2007, FPL will harden 34 feeders that serve 28 acute care facilities and 4 system critical facilities; 43 OH highway crossings on I-75 and the Florida Turnpike; and 78 "01 Switch" poles (first feeder pole out of a substation). For 2008, FPL plans to harden 45 - 60 feeders that serve acute care facilities and system critical facilities; 25 - 35 highway crossings on the Florida Turnpike; and 60 - 65 switch poles. Specific details for 2009 have not been finalized.

New Construction Guidelines - FPL will apply EWL to the design and construction of all new OH facilities, major planned work, relocation projects and daily work activities.

Notes:
(1) FPL's plan also includes Incremental Hardening that will harden up to and including EWL. In 2007, FPL will incrementally harden 34 "Community Project" feeders that serve gas stations, grocery stores and pharmacies and are located near major thoroughfares. For 2008, FPL plans to incrementally harden 15 - 30 "Community Project" feeders. Specific details for 2009 have not been finalized.
(2) FPL has previously provided to Staff and all parties requesting them, all available details on 2007 projects including engineering drawings or line diagrams for all CIF and Community Projects. Additionally, FPL is working with all parties on the timing and details associated with providing annual updates for subsequent years.

Q.
Extreme wind loading standards

For each of the facilities identified in Interrogatory No. 4, please state the annual cost for each facility for each year 2007 through 2009, and the associated effect on storm restoration costs and/or outage times.

A.
See below. See also FPL's responses to Interrogatory Nos. 38 and 50 for effects on storm restoration costs and outage times.

$ millions

Hardening Activities	2007	2008	2009
New Distribution Facilities	$5.5 - $8	$75 - $125	$100 - 150
Major planned expansion, re-build, or relocations	$14 - $16.5		
Critical infrastructure and major thoroughfares	$29 - $37		

Note: Cost of Critical infrastructure in 2007 is $14M - $18M.

Q.

Extreme wind loading standards

What percentage of FPL's total distribution system on a mile basis is considered critical infrastructure?

A.

Approximately 20% of all OH and UG feeder miles are considered critical infrastructure.

Q.
Extreme wind loading standards

What percentage of FPL's total distribution system on a plant-in-service basis is considered critical infrastructure?

A.
This information is not available since FPL does not maintain its records in this manner.

Q.

Extreme wind loading standards

What percentage of FPL's total critical infrastructure on a mile basis requires EWL storm hardening?

A.

FPL estimates that there are approximately 3,000 OH circuit miles of critical infrastructure in its system. FPL plans to EWL harden 100% of its OH critical infrastructure miles.

Q.

Extreme wind loading standards

What percentage of FPL's total critical infrastructure on a plant-in-service basis requires EWL storm hardening?

A.

See FPL's response to Interrogatory No. 8.

Q.

Extreme wind loading standards

What percentage of FPL's total critical infrastructure on a mile basis will be EWL storm hardened for each year from 2007 through 2009?

A.

The details for 2008 and 2009 have not been finalized, but FPL plans to have completed approximately one quarter to one third of its OH critical infrastructure miles by 2009.

Q.

Extreme wind loading standards

What percentage of FPL's total critical infrastructure on a plant-in-service basis will be EWL storm hardened for each year from 2007 through 2009?

A.

This information is not available since FPL does not maintain its records in this manner.

Q.
Extreme wind loading standards

Please state the length of time in days, months, or years, that FPL believes it will take to complete the EWL storm hardening proposed in its Storm Hardening Plan.

A.
FPL plans on EWL hardening all of its critical infrastructure within the next 6-8 years.

Q.

Extreme wind loading standards

What is the estimated cost of EWL storm hardening planned by FPL during the 2007-2009 time frame, compared to the total cost of EWL storm hardening for all critical infrastructure?

A.

FPL estimates that the EWL hardening costs for critical infrastructure and critical poles for 2007 is $14-18 million. 2008 and 2009 EWL costs have not been determined. FPL also has not determined the cost of EWL hardening for all critical infrastructure.

Q.

Extreme wind loading standards

Please identify the portions of FPL's service area in which Grade C facilities were the standard for construction during the years 1993 through 2004.

A.

During the period 1993-2004, Grade B construction was required in all of Monroe, Miami-Dade and Broward and the coastal areas of Palm Beach and Martin counties (east of the Florida Turnpike). Grade C construction was the standard during that period in all other areas of FPL's service territory.

Q.

Extreme wind loading standards

For all service areas in which Grade C facilities were the standard identified in response to Interrogatory No. 14, please describe the planned upgrades for such facilities.

A.

These facilities will be upgraded as a result of various activities or programs. This would include the current pole inspection program, where FPL evaluates pole strength and loading to Grade B and the poles are upgraded to current standards when reinforced or replaced; EWL hardening; incremental hardening; and the application of FPL's new design guidlines for major planned work, relocations and daily work activities.

Q.

Extreme wind loading standards

For each of the facilities identified in response to Interrogatory No. 14, please provide the annual cost for each year 2007 through 2009, and the associated effect on storm restoration costs and/or outage times.

A.

FPL has not specifically targeted existing Grade C constructed facilities in its hardening plan; therefore, costs are not tracked in this manner. See the response to Interrogatory No. 37 for a description of FPL's selection criteia. Additionally, the effects of hardening on storm restoration costs and outages are discussed in response to Interrogatory No. 38.

Q.

Extreme wind loading standards

Please provide a list of all critical infrastructures that existed within the area where Grade C construction was employed.

A.

This interrogatory is ambiguous as to the point in time for which it seeks a response. In any event, FPL has not performed any analysis to determine what critical infrastructure existed prior to Grade C being employed; during the period when Grade C was employed; or after Grade B was reinstituted as the standard. FPL did include in its Storm Hardening Plan, a listing by county by CIF customer, of the 2007 CIF projects, and the response in interrogatory #14 above identifies the counties in which Grade C was the construction standard between 1993 - 2004. Of course, most of the facilities in those counties were built outside that time period and hence would have been built to grade B rather than grade C standards.

Q.

Extreme wind loading standards

For all critical infrastructures listed in response to Interrogatory No. 17, please state to what extent the critical infrastructures have been targeted for hardening under FPL's Storm Hardening Plan for the years 2007 through 2009.

A.

See FPL's response to Interrogatory No. 17. FPL is not targeting grade C facilities in its Storm Hardening Plan; however, we will harden 100% of our critical infrastructure, whether grade B or grade C, in the next 6-8 years.

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

Please provide a list of changes to FPL's current construction standards, policies, practices and procedures proposed by its Storm Hardening Plan.

A.

FPL has focused its hardening plans based on the damage experienced during the 2004-2005 storms which was moslty overhead damage. FPL uses padmounted dead front transformers and switch cabinets made entirely or partly out of stainless steel. This type of equipment is more resilient to corrosion and flooding. FPL has also approved the use of the Vista submersible URD type switch, which is being used as a pilot project on Jupiter Island, and can also be installed at customer request and expense. Cost effective hardening of the underground infrastructure is an industry-wide challange. FPL will continue to work with underground equipment manufacturers as well as with PURC to seek and evaluate new products, work methods and construction techniques.

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

For each change identified in response to Interrogatory No. 19, please state the scope of each change, the cost of each change, the corresponding effect of reducing storm restoration costs and outage times, and how cost-effectiveness is determined.

A.

The incremental cost for the below grade submersible Vista Switch is approximately $25,000-$35,000 per installation over the standard dead front PME Switch. FPL will be able to better evaluate the Vista Gear's cost-effectiveness by comparing its performance to FPL's standard URD switches following a Flood/Storm Surge event.

Q.
Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

If FPL cannot currently estimate the reduced storm restoration costs and outage times, how does it propose to determine cost-effectiveness?

A.
FPL will be able to better evaluate the Vista submersible switch's cost-effectiveness by comparing its performance to FPL's standard URD switches following a Flood/Storm Surge event.

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

During the 2004 and 2005 hurricane seasons, what percent of FPL's underground facilities located in Category 1-3 storm surge areas experienced flooding or storm surge damage?

A.

Approximately 20% of FPL's underground infrastructure is located in the DCA Cat 1 - Cat 3 Zones. FPL's forensics did not not collect or accumulate underground damage data resulting from the 2004 and 2005 storms based on these zones. FPL can state that, based on its experience in 2004 and 2005, damage associated with the impacts of flooding or storm surge have been much less severe in our service territory historically as compared to damage resulting from wind.

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

Please provide a detailed list of the underground facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damage during the 2004 and 2005 hurricane seasons.

A.

See FPL's response to Interrogatory 22. FPL notes that the majority FPL's underground infrastructure is URD type construction and, therefore, the most prevalent pieces of equipment susceptible to flood damage would be padmounted switches and padmounted transformers.

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

During the 2004 and 2005 hurricane seasons, what percent of FPL's overhead facilities located in Category 1-3 storm surge areas experienced extreme wind or wind debris damage?

A.

See FPL's response for interrogatory #22.

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

Please provide a detailed list of the overhead facilities located in Category 1-3 storm surge areas that experienced flooding or storm surge damages during the 2004 and 2005 hurricane seasons.

A.

See FPL's response to Interrogatory 22.

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

Has FPL concluded that underground distribution facilities are less susceptible to storm damage than overhead distribution facilities for coastal areas of its service territory?

A. If so, what is the basis for that conclusion?

A.

This interrogatory is ambiguous as to the type of storm damage to which it is referring, but based on the heading for this series of interrogatories, FPL assumes it is referring to flood and storm surge damage. FPL has not performed any studies quantifying performance differences with respect to flood or storm surge damage between overhead and underground distribution facilities in coastal areas. However, in 2004 and 2005 FPL's system was not as severely impacted by storm surge as it was by wind.

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

Please identify all storm hardening projects located in areas FPL believes are prone to storm surge and flooding.

A.

This information is not available because FPL has not specifically defined and identified the portions of its system that are "prone to storm surge and flooding."

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

Please identify all critical infrastructure sites located in areas FPL believes are prone to storm surge and flooding.

A.

This information is not available. See FPL's response to interrogatory #28.

Q.

Mitigation of Flood and Storm Surge Damage to Underground and Supporting Overhead Distribution Facilities.

Subject Matter: Incremental Changes to Mitigation of Flood and Storm Surge Damage Construction Standards.

How has FPL mitigated flood and storm surge damage to distribution facilities when developers, communities, governmental agencies or homeowners request distribution facilities in the Company's flood and storm surge prone areas?

A.

FPL requires the property owner/developer to provide a letter certifying that the proposed location where FPL facilities are to be installed is within 6" of final grade. FPL also uses padmounted dead front transformers and switch cabinets made entirely or partly out of stainless steel. This type of equipment is more resilient to corrosion and flooding. In addition, FPL has recently approved the Vista submersible switch for use at a customer's request and expense.

Q.

Placement of New and Replacement Distribution Facilities to Facilitate Safe and Efficient Access.

Subject Matter: Incremental Changes to Standards for Placement of New and Replacement Distribution Facilities.

Please provide a list of changes to FPL's current construction standards, polices, practices and procedures contained in its Storm Hardening Plan.

A.

There are no changes to our current construction standards for the placement of new and replacement distribution facilities.

Q.

Placement of New and Replacement Distribution Facilities to Facilitate Safe and Efficient Access.

Subject Matter: Incremental Changes to Standards for Placement of New and Replacement Distribution Facilities.

For each change identified in response to Interrogatory No. 30, please state the scope of each change, the cost of each change, the corresponding effect of reducing storm restoration costs and outage times, and how cost-effectiveness is determined.

A.

Not applicable. See FPL's response to Interrogatory No. 30.

Q.

Placement of New and Replacement Distribution Facilities to Facilitate Safe and Efficient Access.

Subject Matter: Incremental Changes to Standards for Placement of New and Replacement Distribution Facilities.

Please describe FPL's current policy regarding placement of new and replacement facilities, and identify where the policy is described in FPL's Storm Hardening Plan.

A.

FPL's current policy in its Storm Hardening Plan is stated in the appendix item "FPL's Distribution Design Guidelines" page 1 of 6 under the heading of "General" items 1 & 2.

1. Every attempt should be made to place new or replacement poles in private easements or as close to the front edge of property (right of way line) as practical.

2. Overhead pole lines should be placed in front lot lines or accessible locations where feasible.

3. Concrete poles are not to be placed in inaccessible locations or locations that could potentially become inaccessible.

Q.
Description of Facilities Affected

Please provide a list of each geographic site where FPL plans to implement storm hardening activities during the years 2007 through 2009.

A. For each site listed in response to Interrogatory No. 33, please state the scope of the storm hardening activity, estimated investment costs, estimated operational expenses, estimated storm restoration costs savings, estimated reduction in storm caused outages, and criteria FPL used to select the site for storm hardening.

A.
See Storm Hardening Plans matrix below.

For 2007, the priority of electric infrastructure improvements was determined based on CIF priorities as determined by the County EOC Manager/Directors, i.e. Acute Care facilities first, 911 Emergency Communication Centers second, etc. The 2007 Acute Care facilities were chosen based on feeder length. In order to implement a "ramp up" approach, the shortest feeders were selected for 2007 while at the same time concentrating on a higher number of feeders in FPL's more populated areas. Feeders with gas stations, grocery stores and/or pharmacies near major thoroughfares in the Tri-County area are the major focus for the 2007 Community Projects. 01 Switches for 2007 were chosen based on highest customer count and region population. For highway crossings, FPL focused on completing all of I-75 as well as the Turnpike in Miami-Dade and Broward counties. Refer to FPL's responses to Interrogatory Nos. 38 and 50 for restoration costs savings and estimated reduction in storm caused outages.

In 2008 and 2009, FPL will continue to harden feeders serving critical infrastructure, community need businesses on major thoroughfares, road crossings on major evacuation routes and critical 01 switch poles.

	Region	Extreme Wind Feeders	Incremental Hardening Feeders	Highway Crossings	01 Switches	O&M Cost (In $000s)	CAP Cost (in $000
2007	East	7	13	0	21	$900 - $1,200	$8,200 - $10,5
	North	7	0	0	16	$100 - $200	$1,300 - $1,60
	South	18	21	42	35	$1,900 - $2,400	$15,500 - $19,7
	West	6	0	1	6	$100 - $200	$1,000 - $1,20
2008	All	45 - 60	15 - 30	25 - 35	60 - 65	$75 - $125	
2009	All	N/A	N/A	N/A	N/A	$100 - $150	

Notes: Details for the New Construction Guidelines are not available
Detailed plans for 2009 have not been developed

Q.

Communitiesand Areas Where Electric Infrastructure Improvements are Made

Please describe the process that FPL used to determine and schedule which communities would receive electric infrastructure improvements.

A.

See FPL's response to Interrogatory No. 33A.

Q.

Utility's Definition of Critical Infrastructure and Major Thoroughfares

What is FPL's definition of critical infrastructure facilities?

A.

Critical infrastructure facilities (CIF) are those facilities that are essential to the health, safety, welfare, and security of the public. Examples of such facilities are hospitals, 911 centers, special needs shelters, water treatment plants, police and fire stations.

Q.

Utility's Definition of Critical Infrastructure and Major Thoroughfares

What is FPL's definition of major thoroughfares?

A.

FPL has not defined major thoroughfares *per se*; however, FPL's Incremental Hardening initiative targets feeders serving businesses that are especially important to community needs, such as grocery stores, gas stations, and pharmacies. Typically, these businesses are located along or near major thoroughfares.

Q.

Utility's Definition of Critical Infrastructure and Major Thoroughfares

Please describe the process used by FPL to coordinate the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, or local communities.

A. Please identify each governmental agency, company, municipality, or local community, if any, that FPL coordinated with to determine the selection of critical infrastructure and major thoroughfares.

B. If the response to Interrogatory 37(A), is "none," please provide an explanation as to why FPL has not coordinated the selection of critical infrastructure and major thoroughfares with governmental agencies, companies, municipalities, or local communities.

A.

In 2005, FPL implemented its "Critical Infrastructure Function" process. FPL meets annually, prior to hurricane season, with County Emergency Operations Center (EOC) Managers/Directors to identify the critical infrastructure customers within their respective county. During the review process the EOC Managers/Directors identify/confirm the top critical infrastructure customers for priority restoration and make any necessary changes (additions/deletions) to the prior year's list.

A. For critical infrastructure, FPL met with EOC Managers/Directors from all of the the counties within its service territory: Baker, Bradford, Brevard, Broward, Charlotte, Collier, Columbia, Desoto, Flagler, Glades, Hendry, Indian River, Lee, Manatee, Martin, Miami-Dade, Nassau, Okeechobee, Palm Beach, Putnam, Sarasota, Seminole, St Johns, St Lucie, Suwannee, Union and Volusia.

B. The selection criteria for community project feeders was based on the number of essential needs, the type of customers per circuit and the length of the circuit.

Q.

Estimate of Costs and Benefits to the Electric Company

Please provide FPL's estimated costs and benefits for each of its storm hardening activities for the years 2007 through 2009.

A.

Below are FPL's estimated hardening costs for the years 2007 through 2009.

EWL Standards	2007	2008	2009
New Distribution Facilities	$5.5 - $8	$75 - $125	$100 - 150
Major planned expansion, re-build or relocations	$14 - $16.5		
Critical infrastructure and major thoroughfares	$29 - $37		

FPL expects a reduction in storm restoration costs as well as benefits from non-storm (day to day) restoration costs ("Restoration Cost Savings") as a result of its planned hardening activities. FPL has conducted an analysis to determine the relationship between the expected Restoration Cost Savings from the planned hardening activities, and the estimated cost of those activities. This analysis looks at the average Restoration Cost Savings per mile of feeder for all planned hardening activities, rather than at each activity separately, because FPL does not feel that it has sufficient information at this time to distinguish between the benefits attributable to one type of hardening activity versus another.

Moreover, the Restoration Cost Savings have to be expressed as a range at this time, because of the uncertainties inherent in estimating them based on current information. While there are numerous areas of uncertainty, two are particularly important.

First, neither FPL nor the utility industry generally has much experience with hardened distribution facilities. Therefore, there is little directly measured data on the improved resilience, and hence reduced Restoration Cost Savings, resulting from hardening such facilities. FPL has relied primarily upon four sources of data for estimating the improved resilience of hardened distribution facilities.

- FPL has its experience from the 2004-2005 hurricane seasons, which provided substantial insight into the specific causes of pole failures (and hence both the nature and magnitude of potential improvements in storm resilience that could result from addressing those causes).
- Part of the work that KEMA performed for FPL following the 2005 storm season addressed its evaluation of the potential storm-resilience improvements that could be expected from hardening activities.
- FPL has been able to compare the performance during the strong winds of hurricane Wilma of transmission poles (which were designed to EWL standards and generally fared very well) and its distribution poles (which generally were not designed to EWL standards and experienced a significant number of "wind only" failures).
- An independent analysis prepared by Davies Consulting, Inc. in February 2006 addressed the impact of hurricanes with varying strength on pole replacements for FPL and ten other utilities. This report showed that there is a strong correlation between the percentage of poles requiring replacement and the strength of the storms and that FPL's pole replacement rates were lower than those of other utilities for storms of comparable strengths. It is important to note that most of the other utilities in this

analysis build their distribution systems to meet Grade C construction, while FPL's standard has been Grade B construction, which seems to confirm that the strength of the system, i.e., Grade C vs. Grade B vs. EWL does have an impact.

Second, no one is in a position to know for sure how frequently FPL's service territory will be impacted by strong hurricanes. Historically, this has averaged approximately once every five years. However, the experience of the 2004-2005 hurricane seasons as well as some recent meteorolgical analyses suggest that we may be in a period of increased hurricane activity, such that a frequency of at least once every three years may be more representative. The estimate of cumulative Restoration Cost Savings over time will be directly affected by how frequently storms hit FPL's service territory.

Taking these uncertainties into account, FPL has estimated that, over an analytical study period of 30 years, the net present value of Restoration Cost Savings per mile of hardened feeder would be approximately 45% to 70% of the cost to harden that mile of feeder for future major storm frequencies in the range of once every three to five years. Of course, it is possible that FPL will face major storms more frequently than that, as it did in the 2004-2005 hurricane seasons. If that were the case, then the net present value of Restoration Cost Savings likely would exceed the hardening costs.

It is also important to recognize that in addition to Restoration Cost Savings, customers will benefit substantially, and in many direct and indirect ways, from the reduced number and duration of storm and non-storm outages resulting from the planned hardening activities. From the beginning of the discussions with the Commission about storm hardening following the 2005 storm season, FPL has understood that the Commission considers these customer benefits to be important. However, FPL expects that they vary substantially from customer to customer and FPL is not in a position to assign a monetary value to them. Therefore, FPL has not attempted to reflect the customer benefits in its quantitative benefit/cost analysis.

FPL also would like to point out that, while the Commission's storm hardening rule calls for utilities to provide estimates of benefits and costs in connection with their storm hardening plans, the criterion by which the plans are to be judged for approval is whether they are "cost-effective" (*see* Rule 25-6.0342(2)). A commonly-accepted definition of "cost-effective" is an activity that "produces optimum results for the expenditure." Random House Unabridged Dictionary (2006). This is a different measure than the benefit-cost ratio, and is typically used where, as FPL suggests is the case here, a particular outcome is desired without necessarily being able to quantify precisely the benefits of that outcome. In those circumstances, what becomes important from an economic perspective is to ensure that the desired outcome is achieved as efficiently as possible. FPL's storm hardening plan is highly cost-effective, at many levels. It focuses its hardening activities initially on critical infrastructure facilities and community projects, where the most customers will receive the most benefits as quickly as possible. For the facilities that will be hardened to EWL standards, each pole location is evaluated to determine how it can be strengthened to meet those standards at the least cost and with the least disruption. And for community projects, the approach is even more targeted, specifically focusing on "weak link" poles, where hardening a few poles can significantly increase the strength of an entire pole line.

Q.

Estimate of Costs and Benefits to the Electric Company

In its plan, FPL identifies two activities related to mitigating flood and storm surge damages and costs. Please explain why FPL believes that it is cost effective to mitigate storm surge damage to underground facilities throughout its service area.

A.

FPL's standard for all new UG residential distribution equipment, e.g., pad-mounted transfromers and switch cabinets, is "dead-front" made from stainless steel or in combination with mild steel. While stainless steel has a higher initial cost, it has an extended srevice life due to its resistance to weathering and corrosion. Additionally, dead-front equipment, equiopment without energized parts exposed on the operating side of the equipment, is more reliable and more resistant to flooding.

Additionally, FPL is currently piloting the Vista Switch in Jupiter Island to collect cost and performance data for use in determining its cost-effectiveness.

To the extent that FPL can cost-effectively mitigate storm surge and flooding to UG facilities, less outages occur and reductions in restoration time and costs should be realized.

Q.

Estimate of Costs and Benefits to the Electric Company

Please describe the process and metrics FPL uses to ensure cost control, reduction of storm restoration costs, and reduction in storm outages are achieved.

A.

Cost controls, e.g., accounting procedures and processes and procurement procedures and processes, utilized for all hardening construction projects are the same as those used for non-hardening construction projects. Additionally, FPL is cost-effectively hardening its system utilizing its 3 prong approach which targets specific infrastructure for hardening and utilizing its "design tookit" which focuses on evaluating and using cost-effective hardening options for each location.

After a storm event and in accord with initiative 6 of FPL's 10 Storm Preparedness Initiatives filed with the Commission, FPL storm forensic teams will collect forensic data on all affected hardened feeders so that a performance evaluation can be performed, e.g., actual feeder performance vs. expected feeder performance and historical feeder performance. This same type of evaluation would be performed for storm restoration costs and outages.

Q.

Estimates for Costs and Benefits to Third-Party Attachers

Please identify all specific assumptions third-party attachers should use in estimating cost impacts from FPL's Plan for each year from 2007 through 2009.

A.

Utilizing the information from the drawings and diagrams provided by FPL to all attaching entities in April 2007 and information included in FPL's filing, attaching entities should have enough information on the total number of poles affected by hardening in 2007. As a result of their own historical experience, pole costs and pole transfer/reattachment costs should also be available. Additionally, joint users and other attaching entities, are very familiar with the annual calculation of joint use and attachment rates as prescribed by contracts and agreements. Once joint use pole owners and attachers develop their 2007 cost ranges, costs for 2008 and 2009 could be developed utilizing the ranges on the number of feeders to be addressed in 2008 and 2009 versus the number of feeders addressed in 2007.

Q.

Estimates of Costs and Benefits to Third-Party Attachers

Please identify all specific assumptions third-party attachers should use in estimating benefits accruing from the implementation of FPL's Plan for each year from 2007 through 2009.

A.

FPL is not certain of all the assumptions joint pole owners and other attaching entities should use. However, assumptions would include fewer outages, less damage, reduced restoration time and costs.

Q.

Edits and Costs and Benefits to Third-Party Attachers

Please provide the total number of joint use poles that FPL's Plan will impact for each year from 2007 through 2009.

A.

This level of detail is not available. However, based on year-to-date information and the historical relationship of poles with attachments to total poles owned by FPL or joint pole owners, FPL estimates approximately 2000 poles, or 0.2%, will impacted in 2007.

Q.

Edits and Costs and Benefits to Third-Party Attachers

Please state the estimated number or percentage of joint use poles that will be impacted by FPL's Plan for each third-party attacher for each year from 2007 through 2009.

A.

FPL has not accumulated this information. However, the 2007 detailed engineering drawings have been provided to attachers. From these drawings attachers should be able to identify poles with their attachments.

Q.

Estimates of Costs and Benefits to Third-Party Attachers

Please identify FPL's incremental hardening costs for each year from 2007 through 2009 that will be attributable to third-party attachers.

A.

This information has not been separately identified.

Q.

Edits and Costs and Benefits to Third-Party Attachers

Please identify the proportion of FPL's incremental hardening costs attributed to third-party attachers that are perceived to be PSC mandated.

A.

See FPL's response to Interrogatory No. 45. FPL believes that any costs incurred to implement the FPSC-approved hardening plans are "PSC mandated".

Q.

Estimates for Costs and Benefits to Third-Party Attachers

For each circumstance where costs are attributed to third-party attachers, please describe the methodology that will be used by FPL to assign cost among the third-party attachers.

A.

FPL will utilize existing contracts and agreements and/or regulatory agency requirements to assign costs among joint pole owners and other attaching entities.

Q.

Edits and Costs and Benefits to Third-Party Attachers

Please describe the process that FPL will use to notify third-party attachers of the schedule when a pole is being storm-hardened.

A.

FPL has provided, and will continue to provide, updated information to attachers on the circuits that will be affected each year by its Hardening Plan. In addition, FPL plans to conduct pre-construction meetings with all affected joint pole owners and attaching entities to discuss the specifics of circuits targeted for hardening. Finally, FPL and other joint pole owners and attachers have been discussing using "NJUNS" (National Joint Utility Notification System) as a way to standardize/improve the coordination of installing, removing, and reattaching attachments.

Q.

Estimates for Costs and Benefits to Third-Party Attachers

Please describe the process that FPL will use to determine each third-party attachers' share of the costs when a pole is being storm-hardened.

A.

To determine each joint pole owner's or other attaching entity's share of pole hardening costs, FPL will utilize the process(es) expressed in existing contracts and agreements with joint pole owners and attaching entities and/or regulatory agency requirements.

Q.

Estimate of the Effect on Reducing Storm Restoration Costs and Customer Outages

Please provide FPL's estimated reduction in storm restoration costs and customer outages for each of its storm hardening activities for the years 2007 through 2009.

A.

See FPL's response for Interrogatory No. 38.

Q.

Estimate of the Effect on Reducing Storm Restoration Costs and Customer Outages

In its Plan, FPL identifies only two activities related to mitigating flood and storm surge damages and costs. Please describe the analysis FPL used to conclude that this level of activity is cost effective and achieves the goals of Rule 25- 25-6.0342, Florida Administrative Code.

A.

See FPL's response to Interrogatory No. 39. While FPL has not identified any other cost-effective activities to mitigate flood and storm surge damage and costs, FPL is continuing to work with companies that manufacture and supply electrical equipment as well as PURC to seek and evaluate new products, work methods, and construction techniques.

AFFIDAVIT

State of Florida)
)
County of Miami-Dade)

Before me, the undersigned authority, personally appeared Eduardo Prieto, who first being duly sworn, deposes and states:

My name is Eduardo Prieto. I am employed by Florida Power & Light Company (FPL) as Sr. Manager, Distribution System Performance. I prepared or had prepared under my supervision and control FPL's responses to Interrogatories 1-6, 8, 10, 12-40 and 48-51 Staff's 1st Set of Interrogatories to Florida Power & Light Company in Docket No. 070301-EI. Those interrogatory responses are true and correct to the best of my knowledge and belief.

Sworn to and subscribed before me this 10th day of August, 2007, by Eduardo Prieto who is personally known to me.

Notary Public
State of Florida

Notary Stamp:

NOTARY PUBLIC-STATE OF FLORIDA
Carolyn J. Smith
Commission # DD593720
Expires: SEP. 11, 2010
BONDED THRU ATLANTIC BONDING CO., INC.

AFFIDAVIT

State of Florida)
)
County of Miami-Dade)

Before me, the undersigned authority, personally appeared David Bromley, who first being duly sworn, deposes and states:

My name is David Bromley. I am employed by Florida Power & Light Company (FPL) as Manager, Power Systems Regulatory. I prepared or had prepared under my supervision and control FPL's responses to Interrogatories 7, 9, 11, and 41-47 to Staff's 1st Set of Interrogatories to Florida Power & Light Company in Docket No. 070301-EI. Those interrogatory responses are true and correct to the best of my knowledge and belief.

David T. Bromley

Sworn to and subscribed before me this 10th day of August, 2007, by David Bromley who is personally known to me.

Carolyn J. Smith
Notary Public
State of Florida

Notary Stamp:

NOTARY PUBLIC-STATE OF FLORIDA
Carolyn J. Smith
Commission # DD593720
Expires: SEP. 11, 2010
BONDED THRU ATLANTIC BONDING CO., INC.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company.	))))	**Docket No.: 070301-EI Filed: August 13, 2007**

FLORIDA POWER & LIGHT COMPANY'S NOTICE OF SERVING OBJECTIONS AND RESPONSE TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1-51)

Florida Power & Light Company hereby gives notice of serving its Objections and Response to Staff's First Set of Interrogatories (Nos. 1-51) to Lorena Holley, Esq., counsel for the Staff, on August 13, 2007.

John T. Butler, Esq.
Senior Attorney
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408
Telephone: (561) 304-5639
Facsimile: (561) 691-7135

By: /s/ John T. Butler
John T. Butler
Fla. Bar No. 283479

CERTIFICATE OF SERVICE
Docket No. 070301-EI

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by electronic delivery on the 13th day of August, 2007, to the following:

Lorena Holley, Esq. Division of Legal Services Florida Public Service Commission 2540 Shumard Oak Blvd. Tallahassee, Florida 32399-0850	Charles J. Beck, Esq. Office of Public Counsel c/o The Florida Legislature 111 West Madison Street, Room 812 Tallahassee, Florida 32399
Beth Keating Ackerman Law Firm 106 E. College Ave., Suite 1200 Tallahassee, FL 32301 (FCTA)	AT&T Florida J.Meza/E. Edenfield/J. Kay c/o Ms. Nancy H. Sims 150 South Monroe Street, Suite 400 Tallahassee, FL 32301-1556
Davis Law Firm Maria T. Browne 1919 Pennsylvania Ave., N.W., Suite 200 Washington, DC 20006 (FCTA)	Embarq Florida, Inc. Susan S. Masterson Mail Stop: FLTLHO0102 1313 Blair Stone Rd. Tallahassee, FL 32301
Verizon Florida LLC Dulaney L. O'Roark, III 6 Concourse Parkway, Suite 600 Atlanta, GA 30328	Young Law Firm R. Scheffel Wright/John LaVia 225 S. Adams Street, Suite 200 Tallahassee, FL 32301 (MUUC, Town of Jupiter Island, Town of Palm Beach)

By: /s/ John T. Butler
John T. Butler
Fla. Bar No. 283479

Hearing Exhibit - 000552

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company.	))))	**Docket No.: 070301-EI Served: September 25, 2007**

FLORIDA POWER & LIGHT COMPANY'S OBJECTIONS AND RESPONSE TO STAFF'S SECOND SET OF INTERROGATORIES (NOS. 52-57)

Florida Power & Light Company ("FPL") submits the following Objections and Responses to Staff's Second Set of Interrogatories (Nos. 52-57).

I. General Objections

FPL objects to each and every discovery request, to the extent it calls for information protected by the attorney-client privilege, the work product doctrine, the accountant-client privilege, the trade secret privilege, or any other applicable privilege or protection afforded by law, whether such privilege or protection appears at the time response is first made or is later determined to be applicable for any reason. FPL in no way intends to waive any such privilege or protection. The nature of the any such document(s) will be described in a privilege log filed/prepared by FPL.

FPL objects to providing information that is proprietary, confidential business information without provisions in place to protect the confidentiality of the information. FPL in no way intends to waive claims of confidentiality.

FPL objects to each discovery request and any instructions that purport to expand FPL's obligations under applicable law.

Hearing Exhibit - 000554

FPL is a large corporation with employees located in many different locations. In the course of its business, FPL creates numerous documents that are not subject to Florida Public Service Commission or other governmental record retention requirements. These documents are kept in numerous locations and frequently are moved from site to site as employees change jobs or as business is reorganized. Therefore, it is possible that not every relevant document may have been consulted in developing FPL's responses to the discovery requests. Rather, these responses provide all the information that FPL obtained after a reasonable and diligent search conducted in connection with these discovery requests. To the extent that the discovery requests propose to require more, FPL objects on the grounds that compliance would impose an undue burden or expense on FPL.

FPL objects to each discovery request to the extent that it seeks information that is not relevant to the subject matter of this docket and is not reasonably calculated to lead to the discovery of admissible evidence.

FPL objects to each and every discovery request to the extent it is vague, ambiguous overly broad, imprecise, or utilizes terms that are subject to multiple interpretations but are not properly defined or explained for purposes of such discovery requests.

FPL expressly reserves and does not waive any and all objections it may have to the admissibility, authenticity or relevancy of the information provided in its responses to Staff's discovery requests.

II. Response

Attached hereto are FPL's answers to Staff's Second Set of Interrogatories (Nos. 52-57) consistent with its prior objections, together with the affidavit(s) of the person(s) providing said answers.

Respectfully submitted this 25th day of September, 2007.

John T. Butler, Esq.
Senior Attorney
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408
Telephone: (561) 304-5639
Facsimile: (561) 691-7135

By: /s/ John T. Butler
John T. Butler
Fla. Bar No. 283479

CERTIFICATE OF SERVICE
Docket No. 070301-EI

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by electronic delivery and U.S. Mail on the 25th day of September, 2007, to the following:

Lisa Bennett, Esq. Division of Legal Services Florida Public Service Commission 2540 Shumard Oak Blvd. Tallahassee, Florida 32399-0850	Charles J. Beck, Esq. Office of Public Counsel c/o The Florida Legislature 111 West Madison Street, Room 812 Tallahassee, Florida 32399
Beth Keating Ackerman Law Firm 106 E. College Ave., Suite 1200 Tallahassee, FL 32301 (FCTA)	AT&T Florida J.Meza/E. Edenfield/J. Kay c/o Ms. Nancy H. Sims 150 South Monroe Street, Suite 400 Tallahassee, FL 32301-1556
Davis Law Firm Maria T. Browne 1919 Pennsylvania Ave., N.W., Suite 200 Washington, DC 20006 (FCTA)	Embarq Florida, Inc. Susan S. Masterson Mail Stop: FLTLHO0102 1313 Blair Stone Rd. Tallahassee, FL 32301
Verizon Florida LLC Dulaney L. O'Roark, III 6 Concourse Parkway, Suite 600 Atlanta, GA 30328	Young Law Firm R. Scheffel Wright/John LaVia 225 S. Adams Street, Suite 200 Tallahassee, FL 32301 (MUUC, Town of Jupiter Island, Town of Palm Beach)

By: /s/ John T. Butler
John T. Butler
Fla. Bar No. 283479

AFFIDAVIT

State of Florida)

County of Miami Dade)

Before me, the undersigned authority, personally appeared Eduardo Prieto, who first duly sworn, deposes and states:

My name is Eduardo Prieto. I am employed by Florida Power & Light Company (FPL) as Sr. Manager, Distribution System Performance. I prepared or had prepared under my supervision and control FPL's responses to Interrogatories 53, 54, 55, 56, 57 and co-sponsoring Interrogatory 52 to Staff's 2nd Set of Interrogatories to Florida Power & Light Company in Docket No. 070301-EI. Those interrogatory responses are true and correct to the best of my knowledge and belief.

Eduardo Prieto

Sworn to and subscribed before me this 25th day of September, 2007, Eduardo Prieto who is personally known to me.

NOTARY PUBLIC-STATE OF FLORIDA
Carolyn J. Smith
Commission # DD593720
Expires: SEP. 11, 2010
BONDED THRU ATLANTIC BONDING CO., INC.

Notary Public
State of Florida, at Large

My Commission Expires:
9/11/2010

AFFIDAVIT

State of Florida)

County of Miami Dade)

Before me, the undersigned authority, personally appeared H. Antonio Cuba, who first duly sworn, deposes and states:

My name is H. Antonio Cuba. I am employed by Florida Power & Light Company (FPL) as Director of Regulatory Accounting. I prepared or had prepared under my supervision and control FPL's co-sponsored response to Interrogatory 52 to Staff's 2nd. Set of Interrogatories to Florida Power & Light Company in Docket No. 070301-EI. The interrogatory response is true and correct to the best of my knowledge and belief.

H. Antonio Cuba

Sworn to and subscribed before me this 25th day of September, 2007, H. Antonio Cuba who is personally known to me.

NOTARY PUBLIC-STATE OF FLORIDA
Carolyn J. Smith
Commission # DD593720
Expires: SEP. 11, 2010
BONDED THRU ATLANTIC BONDING CO., INC.

Notary Public
State of Florida, at Large

My Commission Expires:
9/11/2010

Q.
What is FPL's annual revenue requirements for the Company's Storm Hardening Plan from 2004 through 2009 for each of the following sub-components:

a) Wooden Pole Inspections

b) Ten Storm Hardening Initiatives

c) Compliance NESC Extreme Wind Loading Standards

d) Mitigating flood and storm surge damage to underground and supporting overhead facilities

e) Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance

f) Other Distribution Hardening Activities

A.

STORM HARDENING PLANS	Revenue Requirements ($000's) 2004	2005	2006	2007	2008	2009
a) Wooden Pole Inspections	$321	$271	$4,494	$16,919	$21,895 - $23,235	$26,594 - $28,670
b) Ten Storm Hardening Initiatives	$41,589	$44,085	$59,229	$75,618 - $76,018	$78,010 - $79,874	$84,434 - $86,907
c) Compliance NESC EWL Standards	$0	$0	$2,966	$11,077 - $14,000	$25,509 - $37,271	$42,076 - $61,851
d) Mitigating flood and storm surge damage to UG and supporting OH	$0	$0	$0	$142 - $175	$92 - $166	$88 - $159
e) Placement of facilities for safe and efficient access	$0	$0	$0	$0	$0	$0
f) Other Distribution Hardening Activities	none	none	none	none	none	none

Notes on Revenue Requirements:

- These revenue requirements are based on the costs contained in the "cost matrix" provided to staff on July 30, 2007.

- 2004 and 2005 reflect base-level activities for pole inspections, transmission structure inspections and vegetation prior to the new programs approved by the Commission beginning 2006.

- Subcomponent "c" includes all facilities hardening projects.

Q.
What is FPL's current incremental cost for upgrading a grade C pole to grade B pole for 2007?

a. What is FPL's current incremental cost for upgrading a grade B pole to a grade A pole for 2007?

A.
FPL's current incremental cost for replacing a grade C pole with a grade B pole for 2007 is $3500 - $7000. Actual pole costs increase approximately $100-$200 for each class size increase.

a. The NESC does not define a 'grade A' pole. Assuming 'grade A' is intended to be EWL, EWL can be achieved utilizing several tools in FPL's "design toolkit", e.g., guying. However, if the pole requires a changeout to achieve EWL, it can be upgraded by either using a stronger wood pole or a concrete pole. The choice of pole type depends on the existing load on the pole that is determined by such factors as span length and size of conductor, equipment on the pole, and size and number of attachments on the pole.

Replace with wood pole: $3500 - $7000
Replace with concrete pole: $7000 - $12,000

Q.
Is FPL currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?

A.
Yes

Q.
If your response to Staff Interrogatory No. 54 is Yes, please give examples of the level of information FPL exchanges using NJUNS.

A.
NJUNS includes the following information:
Ticket Identification Number, Creator, Create Date; Company, Member Location, Engineer Name and contact information; State, County, location coordinates of the pole; Work Requested Date, Job Type (e.g. Set Pole, Transfer, Pull Pole).

Q.

If your response to Staff Interrogatory No. 54 is No, is FPL planning on using NJUNS in the future for notifying parties of utility construction activities?

A.

Not applicable

Q.
If your response to Staff Interrogatory No. 56 is Yes, please describe how, when and with whom will FPL use NJUNS to exchange information regarding construction activities.

A.
Not applicable

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company.	))))	**Docket No.: 070301-EI Filed: September 25, 2007**

FLORIDA POWER & LIGHT COMPANY'S NOTICE OF SERVING OBJECTIONS AND RESPONSES TO STAFF'S SECOND SET OF INTERROGATORIES (NOS. 52-57)

Florida Power & Light Company hereby gives notice of serving its Objections and Responses to Staff's Second Set of Interrogatories (Nos. 52-57) to Lisa Bennett, Esquire, counsel for Staff, on September 25, 2007.

John T. Butler, Esq.
Senior Attorney
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408
Telephone: (561) 304-5639
Facsimile: (561) 691-7135

By: /s/ John T. Butler
John T. Butler
Fla. Bar No. 283479

Hearing Exhibit - 000567

CERTIFICATE OF SERVICE
Docket No. 070301-EI

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by electronic delivery and U.S. Mail on the 25th day of September, 2007, to the following:

Lisa Bennett, Esq. Division of Legal Services Florida Public Service Commission 2540 Shumard Oak Blvd. Tallahassee, Florida 32399-0850	Charles J. Beck, Esq. Office of Public Counsel c/o The Florida Legislature 111 West Madison Street, Room 812 Tallahassee, Florida 32399
Beth Keating Ackerman Law Firm 106 E. College Ave., Suite 1200 Tallahassee, FL 32301 (FCTA)	AT&T Florida J.Meza/E. Edenfield/J. Kay c/o Ms. Nancy H. Sims 150 South Monroe Street, Suite 400 Tallahassee, FL 32301-1556
Davis Law Firm Maria T. Browne 1919 Pennsylvania Ave., N.W., Suite 200 Washington, DC 20006 (FCTA)	Embarq Florida, Inc. Susan S. Masterson Mail Stop: FLTLHO0102 1313 Blair Stone Rd. Tallahassee, FL 32301
Verizon Florida LLC Dulaney L. O'Roark, III 6 Concourse Parkway, Suite 600 Atlanta, GA 30328	Young Law Firm R. Scheffel Wright/John LaVia 225 S. Adams Street, Suite 200 Tallahassee, FL 32301 (MUUC, Town of Jupiter Island, Town of Palm Beach)

By: /s/ John T. Butler
John T. Butler
Fla. Bar No. 283479

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Q.
Please provide data in the attached Storm Hardening Plan Cost Matrix that FPL informally provided to staff on July 30, 2007 (ATTACHMENT A).

A.

The documents provided in response to this request will be made available for inspection at FPL' s General Offices at 215 South Monroe Street, Suite 810, Tallahassee, Florida during normal business hours.

Hearing Exhibit - 000571

Rule 25-6.0342 - Florida Power and Light Company Storm Hardening Plan

	Activity	Docket No.	Actual/Estimated Utility Costs ($ millions) - (O)=O&M, (C)=Capital						Estimated Benefits to Utility Customers: Impact on Storm Restoration Costs ($ millions)			Estimated Benefits to Utility Customers: Impact on Storm Caused Outages			Other Estimated Company Benefits			Estimated Benefits to Third Party Attachers: Impact on Storm Restoration Costs			Estimated Benefits to Third Party Attachers: Impact on Storm Caused Outages		
			2004	2005	2006	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
(a)	**Wooden Pole Inspections.**	060078-EI see Note (a)	(O)$0.3 (C)$0.2	(O)$0.2 (C)$0.4	(O)$3.8 (C)$7.4	(O)$13.1 (C)$28.2	(O)$13-14 (C)$27-31	(O)$13-14 (C)$27-31	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
	Ten Storm Hardening Initiatives.	060198-EI																					
(b)	1 A Three-Year Vegetation Management Cycle for Distribution Circuits	see Note (b)	(O)$38.6	(O)$39.3	(O)$52.6	(O)$65.1	(O)$64.4	(O)$68.4	$0.6 (10yr annual avg.)	$0.6 (10yr annual avg.)	$0.6 (10yr annual avg.)	100,000 (10yr annual avg. CI)	100,000 (10yr annual avg. CI)	100,000 (10yr annual avg. CI)	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(c)	2 An Audit of Joint-Use Attachment Agreements		n/a	n/a	n/a	(O)$1.2-1.5 T&D	(O)$1.2-1.5 T&D	(O)$1.2-1.5 T&D	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(d)	3 A Six-Year Transmission Structure Inspection Program		(O)$1.7 (C)$8.9	(O)$2.0 (C)$8.9	(O)$2.8 (C)$10.4	(O)$2.6 (C)$10.6	(O)$2.5-3.5 (C)$9.5-10.5	(O)$2.5-3.5 (C)$9.5-10.5	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(e)	4 Hardening of Existing Transmission Structures		n/a	n/a	n/a	(O)$0.4 (C)$6.9	(O)$0.3- $0.5 (C)$5-7.5	(O)$0.3-0.5 (C)$5-7.5	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(f)	5 Transmission and Distribution GIS		n/a	n/a	(O) $0.03 (C) $0	(O) $0.03 (C) $2.2	(O) $0.10 (C) $2.3	(O) $0.11 (C) $1.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(g)	6 Post-Storm Data Collection and Forensic Analysis	see Note (g)	n/a	n/a	(O) $0.07	see Note (g)	see Note (g)	see Note (g)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(h)	7 Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems	see Note (h)	n/a	n/a	n/a	see Note (h)	see Note (h)	see Note (h)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(i)	8 Increased Utility Coordination with Local Governments		n/a	n/a	(O) $0.05	(O) $0.05	(O) $0.15	(O) $0.05	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(j)	9 Collaborative Research on Effects of Hurricane Winds and Storm Surge		n/a	n/a	n/a	(O) $0.05-0.10	(O) $0.05-0.10	(O) $0.05-0.10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(k)	10 A Natural Disaster Preparedness and Recovery Program	See Note (k)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Compliance with National Electric Safety Code's adoption of Extreme Wind Loading Standards.	070xxx-EI																					
(l)	1 New Distribution Facilities	see Notes (l)-(n)	n/a	n/a	n/a	(O)$0.5 - 1.0 (C)$5.0 - 7.0	$75-125	$100-150	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(m)	2 Major planned expansion, rebuild, or relocation of distribution facilities	see Notes (l)-(n)	n/a	n/a	n/a	(O)$1.0 - 1.5 (C)$13 - 15			n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(n)	3 Critical infrastructure and major thoroughfares	see Notes (l)-(n)	n/a	n/a	(O)$1.7 (C)$15.9	(O)$3 -$4 (C)$26 - 33			n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
	Mitigating flood and storm surge damage to underground and supporting overhead facilities.	070xxx-EI																					
(o)	1 Transmission		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(p)	2 Distribution		n/a	n/a	n/a	(O) $0.05-0.1 (C) $0.45-0.9	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(q)	**Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance.**	070xxx-EI	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	TOTALS	O&M Capital	(O)$40.6 (C)$9.1	(O)$41.5 (C)$9.3	(O)$61.1 (C)$17.8	(O)$87.1-89.5 (C)$71.9-103.9	$201-261	$229-289															

Item ltr NOTES:

(a) Costs associated with inspections performed as part of daily work are not captured separately and therefore are not included.

(b) Benefits from FPL's proposal (filed June 1, 2006) for the FPSC 10-Point Storm Secure Plan

(g) FPL's proposal (filed June 1, 2006) for the FPSC 10-Point Storm Secure Plan - $50k-$100k per storm.

(h) FPL's proposal (filed June 1, 2006) for the FPSC 10-Point Storm Secure Plan - $50k-$100k per storm.

(k) FPL's existing plan meets Commission proposal requirement. No additional cost expected.

(l) - (n) "Estimated Benefits to Utility Customers" and "Other Estimated Company Benefits" to be provided in FPL's responses to Staff's 1st Set of Interrogatories, Docket No. 070301-EI, where "n/q" is "Not yet quantified". Where "n/a", not available or applicable to FPL.

(n) 2007 costs are engineering estimates, not as-built. 2008-2009 are higher level planning estimates.

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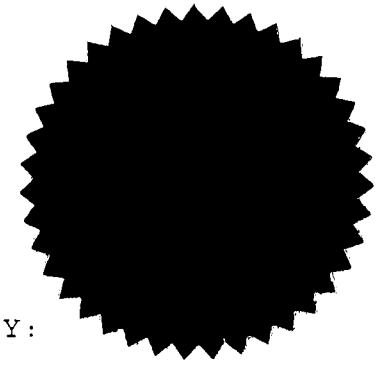
BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company.	DOCKET NO. 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	DOCKET NO. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company.	DOCKET NO. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company.	DOCKET NO. 070301-EI

_____/

TELEPHONIC DEPOSITION OF:	MANUEL B. MIRANDA
TAKEN AT THE INSTANCE OF:	Attorneys for FPSC
DATE:	September 19, 2007
TIME:	Commenced at 10:00 a.m. Concluded at 3:00 p.m.
LOCATION:	Room 362, Gunter Bldg. 2540 Shumard Oak Blvd. Tallahassee, Florida
REPORTED BY:	CAROLYN L. RANKINE Notary Public in and for the State of Florida at Large



ACCURATE STENOTYPE REPORTER, INC.
2894-A Remington Green Lane
Tallahassee, Florida 32308
850.878.2221

APPEARANCES:

KATHERINE E. FLEMING, ESQUIRE,
KEINO YOUNG, ESQUIRE,
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* * *

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ATTACHED:		
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PROCEEDINGS

The following deposition of *MANUEL B. MIRANDA* was taken on oral examination, pursuant to notice, for purposes of discovery, and for use as evidence and for other uses and purposes as may be permitted by the applicable and governing rules. Reading and signing is not waived.

* * *

MANUEL B. MIRANDA

was called as a witness, having been first duly sworn by Jennifer M. Payne, Commission: DD439096, was examined and testified as follows:

MS. FLEMING: Let's go ahead and take appearances for the court reporter, please.

MR. BUTLER: Well, I guess I'll start, it's John Butler, attorney for Florida Power & Light Company.

MR. SEIVER: John Seiver and Maria Browne for the Florida Cable Telecommunications Association.

MR. O'ROARK: D. O'Roark for Verizon

MS. MASTERTON: Suzanne Masterton for Embark.

MR. HATCH: Tracy Hatch for AT&T Florida.

MS. KAY: Jennifer Kay for AT&T Florida.

Hearing Exhibit - 000577

MS. FLEMING: Is that everyone else on the line?

MR. WILLIS: This is Lee Willis. I just plan to listen.

MS. FLEMING: And this is Katherine Fleming on behalf of the commission. Let's go ahead and get started.

DIRECT EXAMINATION

Q Good morning, Mr. Miranda, how are you today?

A Good morning. How are you? Doing great, thank you.

Q Good. I'm glad to hear it. Before we get started with the questions, we'll be asking you a series of questions. And if you have -- if you need any clarifications or don't understand the question that I'm asking you please let me know and we'll try to work through it together or I'll paraphrase or rephrase the question.

A Very good.

Q What documents do you have in front of you today?

A I have my direct testimony with the attached exhibits to it, I also have my rebuttal testimony, I have our response to the FPSC staff's

Hearing Exhibit - 000578

first set of interrogatories.

I also have a couple of other documents. I have our filing on the 10-point plan , and it's called Florida Power & Light's storm hardening plan, which includes the 10-point plan , and the cost per, and also the hardening plan associated with that.

I have our calculation of the cable TV distribution attachment rate. And I have a couple fact sheets concerning TECO service territory, net tel service territory.

Q Is that everything?

A Yes.

MR. BUTLER: Just for clarification the materials after the answers to your interrogatories are what he brought as the materials he used in preparing his testimony per your depo notice.

MS. FLEMING: Great. Thank you.

BY MS. FLEMING:

Q Mr. Miranda, please, state your name and business address for the record.

A My name is Manuel, M-A-N-U-E-L; Miranda, M-I-R-A-N-D-A. I go by the nickname of Manny, M-A-N-N-Y. My business address is 9250 West Flagler Street which is Miami, Florida 33174.

Hearing Exhibit - 000579

Q And you're employed by FPL, correct?

A That is correct.

Q And what is your position with FPL?

A I am currently vice-president of our distribution central maintenance and execution department.

Q Let me have you turn to your direct prefiled testimony, page 16, please. And I'm looking specifically at lines 13 through 15. In this set of questions you're discussing uncertainties as far as the storms. You state that no one can know for sure how frequently FPL service territory will be impacted by strong hurricanes. Do you see that?

A Yes, I do.

Q What do you mean by strong hurricanes?

A Well, what we were describing what the intensity of the hurricanes. What I was referring to in that direct testimony was that there's two components that we have to consider when looking at the benefits associated with any restoration or hardening activities. One is the path of the storm, right, the frequency of the storm, how often we're going to be impacted by a storm, and then the intensity which is the strength the storm whether

Hearing Exhibit - 000580

it's a category 1, 2, 3, 4, or 5.

Q So when you're describing a strong hurricane does FPL have an opinion as to what category that would start off with? Would that be a category 3 or higher, or are you just including all categories of hurricanes?

A We were just including all categories of hurricanes.

Q Let me have you to turn to page 17 of your testimony, specifically lines 18 through 20. In this section you're discussing what FPL utilized to estimate the resilience of hardening distribution facilities, and you state that FPL believes that a key factor in its superior pole performance was FPL's Grade B construction standard; whereas, all other utilities built their distribution system to meet Grade C construction, is that correct?

A That's correct.

Q Which specific utilities did you include in the Grade B versus Grade C construction standards that you -- in the analysis that you make?

A We hired Davies Consulting to conduct an analysis to look at utilities that were impacted by hurricane activity as well as look at, you know, our own performance. And as part of that consulting

Hearing Exhibit - 000581

service, they went out and contacted 10 utilities, however, as part of that agreement they do not provide us the listing of who those utilities are. But they are utilities that were impacted by hurricanes during this period.

Q How many of those utilities were in Florida?

A Again, I do not know the answer of where those utilities were located.

Q And what was the name of the consultant firm that you used?

A Davies.

Q Is there any way to get that information from them?

A We can ask them if they -- but they would have to get release of confidentiality from the respective utilities.

MS. FLEMING: Mr. Butler, can you all look into that and see if there's any way we can get that information as well, please?

MR. BUTLER: What you're looking for is you would like to know the identity of the 10 utilities that Davies contacted and whose information was used for the preparation of MBM-3.

MS. FLEMING: Yes, that's correct.

MR. BUTLER: We can look into it. I don't know what their response is going to be.

MS. FLEMING: That's fine. Just let us know what their response is and we can go from there.

MR. BUTLER: Okay.

MS. FLEMING: Thank you.

BY MS. FLEMING:

Q Mr. Miranda, you filed Exhibit MBM-1 with your direct prefiled testimony, correct?

A Correct.

Q I am looking at it state's page 10 on the bottom but in the exhibit title page it's page 11 of 223. It consists of figure 4-1 which is a graph with FPL extreme wind conditions. Let me know when you're there, please.

A That's figure 4-1, yes.

Q Are the colored areas on this graph those counties where FPL currently provides retail electric service?

A Yes.

Q Is the yellow region on this graph where FPL is proposing 130-mile-per-hour extreme wind standard?

A Yellow represents, yes, the 130-mile-an-hour zone.

Q And I see that on this map there are several contour lines. What -- what do those -- what is the significance of those contour lines?

A The contour lines were based on the ASCE, which is the American Society of Civil Engineers, which represents hurricane activity, or winds that could be expected in those zones over a 50-year period. The contours represent, if we would take, for example, the hundred-and-forty-mile-an-hour contour, everything on the outside of that contour would represent that there is a probability of having that type of wind, a three-second gust during this period of 140 mile an hour. And the different contours represents the different wind profiles throughout our service territory.

Q So as we go inland, each contour line would be 10 miles per hour less, is that correct?

A Yes.

Q So looking at the 130-mile-per-hour contour, could you describe where the starting and ending point is for that 130-mile-per-hour contour?

A On which coast?

Q You can start on either coast. I just want

to see where it covers, from the east coast to the west coast. So whatever your preference.

A On the east coast it starts -- I think that would be Indian River County, and it goes from that county all the way up east till we get all the way to our northernmost part of our territory which is up in Nassau County. And on the west coast it's I guess Lee, that would be Lee. I don't have the counties in front of me so I'm just going a little bit by memory at this point. But I think it's Lee County all the way up to I guess that would be Manasota, or Sarasota County.

Q So is that similar in proximity maybe near St. Pete?

A It's south of St. Pete, yes.

Q And then as far as the east coast, is it near the Cape Canaveral area?

A It's actually south of Cape Canaveral. I think that probably starts in Brevard I would think.

Q Okay.

A That would be, what, Volusia County.

Q Okay. That's helpful. Thank you.

A I'm sorry. I don't have the county map in front of me.

Hearing Exhibit - 000585

Q That's okay. Thank you. So inland from this 130-mile-per-hour contour, based on this, the history of wind speed actually drops, correct?

A Correct.

Q But inland from this 130-mile-per-hour contour FPL is proposing a 130-mile-per-hour extreme wind standard, correct?

A Correct.

Q Why is FPL proposing a 130-mile-per-hour extreme wind standard in a region where historical wind speeds have been less than 130 miles per hour?

A We evaluated, Katherine, all the wind zones versus all the counties that we could have in our service territory. And if you wanted to have the exact corresponding wind -- a wind zone to the contours of the map, it would translate that we would have nine zones instead of the three that you see on this map.

So we did evaluate looking at going to a complete nine zones, we looked at evaluating versus three zones, what you saw here. And we also looked even having the entire state under one entire zone, which would be the 145-mile-per-hour wind zone.

So the reason that we ultimately ended up at three was we wanted to make sure that we can

Hearing Exhibit - 000586

balance our ability to execute effectively our new construction standards throughout each one of these service territories. So it was a balance between our ability to develop nine standards, if you will, throughout our territory versus, you know, the three zones that we ultimately arrived to.

Q And just a moment ago you said you balanced with having this wind standard throughout the entire state. So for purposes of this question, let's assume that FPL service area is the entire Florida peninsula. Would you recommend commission that a 130-mile-per-hour wind standard be implemented along the western region of the State of Florida?

A I cannot comment for the territory outside of FPL's service territory. I did not look at where those wind zones go through the west side and through the peninsula. But for the west coast of our territory which shows the counties that we've highlighted, the 130 mile an hour is what we believe the appropriate wind zone. Down in the Collier County, as you can see, they have a higher probability of higher winds and that's why we went with the 145-mile-an-hour wind zone.

Q So when FPL was looking at determining their wind then FPL only looked at their own

Hearing Exhibit - 000587

specific counties that FPL is providing service in, is that correct?

A That is correct.

Q So you did not look at any other counties where retail electric service may we provided by any other IOU?

A We did not.

Q Okay.

A And just to clarify on this map, even though we show entire counties, these are just where we have some customers in there. As you know, many parts of those counties are served by other utilities or co-ops and munis, but for the purposes of our communications internally we show the entire area to be geographically -- we know -- we understand that, you know, there's other utilities that serve some of these customers in these respective counties.

Q Now, I know that you just stated that FPL did not look at the other IOUs' wind standards, but are you generally familiar with the storm plans filed by the other IOUs in this docket, in the consolidated dockets?

A I would say generally.

Q Generally, okay. Generally speaking, if

Hearing Exhibit - 000588

you know, are the TECO and Progress service areas located in a region that could fall within the 130-mile-per-hour wind zone?

A Yes. I think there are pieces of the territory that fall within the 130 mile an hour, but it's really on the edge of it I would think. I'm just looking at that map. I don't have the peninsula on this map. I could get another map if you like that shows the rest of the state.

Q This is okay. Thank you, though. If we need it, we'll take a break and get that other map. So based on your understanding then it's -- TECO service area could possibly fall in the area where there is a 130-mile-per-hour wind history, correct?

A It would be right on the edge, though. They would be better to answer that question.

Q Well, do you know if you can answer whether Tampa Electric is proposing a 130-mile-per-hour extreme wind standard?

A From what I understand they are proposing to go to Grade B construction.

Q And if you know, is Progress proposing a 130-mile-per-hour wind standard?

A I understand Progress has filed it for a Grade C construction. I'm not sure if that's

changed. That was the last I had heard.

Q And you stated earlier we've set the record that TECO, a small portion of it falls under the 130-mile-per-hour wind zone. What about Progress' service area?

A Katherine, again, I'm sorry. I would have to get a better map to look at their in-fact boundaries. I really am not as knowledgeable on their service territory. I can see the map and do kind of, you know, a high level overview. But where exactly that line is I would have to get a more detailed map.

Q Well, assuming for purposes that a portion of Progress and/or TECO service areas could potentially be in the 130-mile-per-hour wind zone, do you believe that there is something unique about the specific areas currently served by FPL that's not currently applicable to the other areas in the State of Florida?

A Again, I do not want to answer for TECO and Progress. But what I do want to say is for FPL service territory we believe that the wind zone maps clearly apply.

Q So for purposes of this docket then FPL believes that FPL is situated in an area where the

130-mile-per-hour wind zone standards is appropriate for FPL's service territory?

A Yes. Based on our experiences in 2004 and the 2005 hurricane seasons, our forensic analysis that we conducted following Hurricane Wilma, we believe that our proposed wind zone maps are appropriate for Florida Power & Light.

MR. BUTLER: Katherine?

MS. FLEMING: Yes.

MR. BUTLER: To clarify if I may the record your question asked whether we think that FPL believes that the 130-mile-per-hour wind zone applies to its service territory. As you know from the exhibit you're talking about here, we got three different zones. And some portions of those zones apply to all of the service territory. So was your question intended to say that 130 was appropriate for the whole service territory?

MS. FLEMING: No, it was not. We were just speaking just specifically to the portion that's highlighted in yellow with the 130-mile-per-hour wind zone. I was not referring to 140- or 45-mile-per-hour wind zone at all.

MR. BUTLER: Or the 105.

MS. FLEMING: Or the 105. Just strictly the 130-mile-per-hour wind zone.

MR. BUTLER: Okay. Thank you.

BY MS. FLEMING:

Q Mr. Miranda, let me have you turn back to your testimony, page 18, please.

A Okay.

Q Specifically lines 13 through 16 where you're discussing the storm restoration cost savings.

A Yes.

Q You state that over an analytical period of time of 30 years the net present value per mile of hardened feeder would be approximately 45 to 70 percent of the cost to harden the feeder at a storm frequency of once every three to five years, correct?

A That's correct.

Q So is that saying that over 30 years ratepayers will recoup approximately 70 percent of the cost of hardening?

A Assuming that we would have an average storm every three years during that period, yes.

Q So if Florida has more extreme storms such as Wilma every three years, then the ratepayers

would break even after 30 years?

A That's correct.

Q So the bottom line is the higher frequency and higher intensity storms contribute to greater restoration cost savings, is that correct?

A That's correct. And, Katherine, I would like to add, you know, that -- you know, I think that it's an important point to maybe share with you and I think all of us know that the reason that we're hardening is not strictly because of the direct benefits associated to Florida Power & Light. Clearly, you know, following the '04 and '05 hurricane season, you know, our customers, you know, our public officials, the commission, the commission staff, and even us here at FPL clearly knew that we needed to take action. And there was a lot of concern with these -- all these constituents about the outages, number of outages, the length of these outages, and it was clear that there is value to them as well about having shorter and fewer restoration outages during this period. So we cannot put a -- we cannot calculate that. In many ways the calculation of FPL is the easier component, but it's really important that we keep in context of the value that there is externally to our customers

Hearing Exhibit - 000593

about having fewer and shorter restoration time frames.

Q And on that same note then, currently FPL has hardening initiatives in place, is that correct?

A That's correct.

Q And how are those hardening initiatives? Are they successful? Are the customers happy?

MR. BUTLER: I'm sorry. When you're referring to hardening initiatives what are you referring to, Katherine?

MS. FLEMING: Well, currently there are steps that FPL is using to restore power, if we have instances of hurricane. Here FPL is proposing to increase the standards and construction standards that they currently have in place. And I guess my question which your witness just touched on that they feel that they need to increase the standards even more. And I'm trying to find a basis for the increase. Because if the standards are satisfactory right now, is there really a need to increase the standards even more? Does that make sense, John?

MR. BUTLER: I think it does.

MS. FLEMING: Do you want me to try to

Hearing Exhibit - 000594

rephrase that?

MR. BUTLER: That's okay. I mean, Manny, are you comfortable answering the question?

A I think to answer your first question, your last point is based on the feedback that we heard from our customers and our public officials our current standard is not adequate. I mean, clearly we cannot continue to have a repeat of our hurricane performance going forward.

As far as the hardening initiatives with the customers that we have been involved with so for example, Port Everglades is a great example of a customer in which we identified as a critical infrastructure working with our ELC leaders because they provide, you know, almost 80 percent or 90 percent of all the fueling needs of all of south Florida, absolutely critical that we harden their infrastructure.

And I know I have met personally with the port director and they are very pleased with the actions that we are taking, that we are upgrading our facilities to withstand a higher wind profile, and they believe those are the appropriate course of action that we should be taking.

BY MS. FLEMING:

Q So FPL believes that it's necessary or appropriate in this instance to harden its plans and spend additional money on hardening?

A Yes.

Q Continuing back to the restoration cost savings that we were discussing a few moments ago. Is there a copy of that analysis, of the restoration cost analysis, in your testimony?

A It is not in my testimony.

Q Can you explain why it's not included in your testimony?

A We have it available and we could provide that to you.

MS. FLEMING: Could we -- I would ask that we have a late-filed exhibit for the -- and we could title it restoration cost savings analysis.

MR. BUTLER: That is fine.

MS. FLEMING: And that will be Late-Filed Exhibit Number 1.

(Late-Filed Exhibit 1 identified.)

BY MS. FLEMING:

Q Thank you, Mr. Miranda. On the same discussion of storm restoration costs. If FPL incurs storm restoration costs, does it charge those

Hearing Exhibit - 000596

costs against its storm reserve?

A Against the storm reserve?

Q Yes.

MR. BUTLER: I'm not sure that Mr. Miranda is all that familiar with the accounting for the storm restoration cost.

MS. FLEMING: That's fine.

BY MS. FLEMING:

Q I guess the bottom line that I just wanted to get to and maybe we can work through this is that: if these hardening plans are successful, would you expect a reduction in the storm reserve as a component of base rates?

MR. BUTLER: A reduction in the storm reserve level or a reduction in charges that would be made over time to the storm reserve?

MS. FLEMING: In reduction in the charges that would be made over time to the storm reserve.

A I would think the answer would be yes.

BY MS. FLEMING:

Q Thank you. That's sufficient. Now, I'm going to have a series of questions regarding FPL's response to staff's first set of interrogatories. So if you could get those in front of you.

Hearing Exhibit - 000597

A Okay.

Q The first interrogatory response I'm looking at is number 20.

A Okay.

Q And in this response FPL is discussing the Vista Switch.

A Yes.

Q Is the installation of the Vista Switch -- is it an effort on behalf of FPL to reduce storm restoration costs, outage times, and assess the cost effectiveness of this equipment?

A That is our goal, yes.

Q Do you have any idea of when FPL will complete its cost effectiveness assessment on this Vista Switch program?

A Well, let me back up a little bit. As far as the Vista Switch is concerned we have approved it as a standard for our -- as a construction standard and for those customers who want to pay the differential cost for that facility we now provide that. We are currently evaluating the Vista Switch from all aspects from an operational perspective, from an installation perspective and, you know, in the unfortunate event we have a hurricane clearly then we would understand its flooding and storm

Hearing Exhibit - 000598

surge capability as well.

Q You just stated that you've approved it as a standard for construction standards, is that correct?

A It's available as to be installed in the field upon customer request.

Q So is the installation of this Vista Switch a field trial?

A I'm not sure how to describe -- how do you define field trial?

Q Just as a trial basis or it's an actual approved program that once it's requested by customers to implement this, FPL will put it in as a standard?

A Yes. If a customer requests to have the Vista Switchgear put into their -- into say their project, we will -- if they pay the differential cost, we will install it at that point.

Q The second sentence of the response to your interrogatory number 20 says that FPL will be able to better evaluate the Vista gears cost effectiveness by comparing its performance to FPL standard URD switches following a flood/storm surge event.

A Correct.

Q So at this point FPL has not been able to determine the cost effectiveness?

A Not at this point. Katherine, we got several efforts going on, you know, as part of the hardening initiatives. As you know the commission staff asked us to look at what it would take to harden our underground facilities as well.

And, you know, we have been working with our manufacturers on our current -- we currently buy our switchgear, which is our -- what we call our padmounted switchgear on a deadfront type installation. We have reached out to them to see where -- what components of those can be looked to maybe strengthen, if you will, from an underground perspective to improve the resiliency of our standard installation as it relates to floods.

Concerning the cost effectiveness that we mentioned here, we have not had a funding condition since our filing to be able to make those type of comparisons at this point. But we got multiple activities trying to shore up even our standard installation.

Q Well, in order to determine the cost effectiveness you state that you're waiting on a flood/storm surge event. Would a simulation of a

Hearing Exhibit - 000600

flood/surge storm event, using real equipment in a control setting answer FPL's questions regarding its cost effectiveness?

A The answer is yes, we could, you know, look at what we would anticipate to be a voided cost. You know, we can estimate some kind of a voided cost utilizing the Vista gear versus our traditional padmount deadfront equipment and then we can maybe look at the frequency of when we -- you know, how often we think we would have flooding. But I think it's important for us to just remind ourselves that, at least for the '04 and '05 hurricane season, the majority of our interruptions were in the overhead infrastructure and we saw little, little flooding and storm surge impact to our service territory.

Q So then in order to evaluate the cost effectiveness of this program is FPL just waiting for a real hurricane event to determine the cost effectiveness?

A We will -- you know, following a storm up, we will conduct forensics on the equipment and see how it performed from the flooding. The other thing that we'll have to also evaluate, Katherine -- it isn't just strictly as it relates to hurricanes. We also have to evaluate the operational expenses

Hearing Exhibit - 000601

associated with that equipment over time. We have clearly the manufacturer's expectations on operating expenses associated with this equipment. So we have a lot of history on our current padmounted equipment. We just need to understand this equipment and how it will perform going forward.

Q So let me try to backtrack and try to understand this. So then FPL is going to wait until there is a flood or a surge event in order to determine the cost effectiveness, is that correct? Did I understand you correctly?

A Again I think -- well, that's going to be one component. Clearly at the end of this, if we have a hurricane, we will conduct forensics on that equipment to see how it performed. So part of that is yes.

But between here and hopefully never we would also look at our installation cost to install this equipment, we'll look at the operating expenses and savings associated, how does this equipment performed, you know, during our afternoon thunderstorms, you know, any weather. We will be monitoring the performance of this equipment going forward to make sure we understand the operating cost associated with it, you know, going forward.

Hearing Exhibit - 000602

It's a couple of fronts that we have to keep working on.

Q So then a simulation of a flood or a surge event wouldn't necessarily provide you all the data that the utility would need to determine cost effectiveness as would a real flood or event?

A You know, mother nature has a way of changing things from a simulation but, you know, I think simulations are a good tool. But the manufacturer has conducted a lot of this type of test, you know, understanding its flood resistance. So we have some data. It's not to say we don't have any data. And we'll continue to evaluate, you know, this gear as we continue to look to improve our underground hardening. By no means are we -- you know, it's a tool in our tool kit that we have to continue to evaluate.

Q Okay. Thank you. Let me have you turn now to interrogatory number 22.

A Okay.

Q And in this interrogatory FPL states that FPL's forensics did not collect or accumulate underground damage data resulting from the 2004 and 2005 storms based on these zones.

A That's correct.

Hearing Exhibit - 000603

Q Does FPL currently have a program in place that collects or accumulates storm performance data on its underground facilities?

A As part of the 10-point preparedness plan that we filed with the commission, one of the components is to conduct forensics following a hurricane on our underground infrastructure. So we do have plans to conduct forensics in the event of a storm.

Q Is the collection and accumulation of storm performance data on underground facilities necessary to determine cost effectiveness?

A I would think that it's an important factor, Katherine. You know, I think it's, you know, kind of similar to what we found out in Wilma. We need to understand the root causes of these storms, what drives the interruption. Sometimes it's flooding, sometimes it's a storm surge, sometimes it's sand that gets into the facilities themselves, the pads get blown off completely off their concrete pads. I think it's important we really conduct good specific analysis following a storm so that we can really make sure we're addressing the root causes associated with whatever impacts the underground infrastructure.

Hearing Exhibit - 000604

Q Now, let's turn to interrogatory response number 23.

A Yes.

Q In summary FPL states that the most prevalent pieces of equipment susceptible to flood damage would be the padmount and switches and padmount and transformers and I think you touched on those briefly. So those switches and transformers are the most prevalent pieces that are subject to flood damage?

A It is the largest number of infrastructure that we have that would be the most prevalent, yes.

Q Are you aware that other utilities are looking into the solid-state resin-encased transformers?

A No, I am not aware of that.

Q Has FPL looked at other options besides the padmount and switches and padmount and transformers?

A Excuse me. You mean the solid-state, resin-encased transformer? Could you just clarify who is looking at that?

Q Actually I was not told who was looking at that. I'm sorry.

A You got a confidentiality agreement.

Hearing Exhibit - 000605

Q Maybe we do and I just wasn't told.

A Katherine, for our purposes we have -- you know, any product or technology that's available we would clearly be open and looking at that. I know I have personally met with our transformer manufacturers, our largest production of transformers, and they don't have that technology available as far as making it completely flood proof, if you will. I have asked them to evaluate it, they're going back and going to be looking at it. I know I have met with our manufacturers of our switch cabinets as well.

I too am very interested and trying to get our current equipment to be less susceptible to flooding as well. And they understand the interest. And as we work together in the state to clearly identify the need, I think more manufacturers will understand the importance of this and I think it will start to create a market, and they'll start to create products that can make our facilities more resilient to flooding and storm surge. I think we're all on the same page and wanting to go forward.

Q Let me have you turn to interrogatory number 27, please.

Hearing Exhibit - 000606

A Okay.

Q In this question staff was asking about -- asking FPL to identify all storm hardening projects that were in areas that FPL believed were prone to storm surge and flooding. And FPL stated that FPL has not specifically defined and identified the portions of the system that are prone to storm surge and flooding, is that correct?

A That is correct.

Q Can the cost effectiveness of a certain piece of equipment whether it be the switches or the transformers or technology, can they be significantly impacted by site-specific factors?

A I would think so, Katherine. I would think that if we identified certain zones within our territory that have higher probabilities of -- kind of like we did with the overhead infrastructure where we have a higher probability of winds, if there are comparable areas within our territory that has higher probability of flooding, and we can identify those and define those, then I think the answer to your question is yes. Then I think it would help to justify going with, you know, maybe more expensive pieces of equipment to help mitigate the amount of damage resulting from flooding or from

Hearing Exhibit - 000607

storm surges.

Q And you just mentioned the overhead and increase in the equipment for overhead, so is that how FPL is going about addressing the effects of site-specific factors in its cost effectiveness analysis?

A Repeat the question for me.

Q Well, how is FPL addressing the effects of site-specific factors in the cost-effective analysis?

MR. BUTLER: Of what? Of the overhead system, or the underground system, or both?

MS. FLEMING: Both.

A With the overhead system, you know, we are looking at the wind zones that we define and also we are looking at the different hardening approaches that we're taking, whether we're building it to extreme wind, the incremental hardening, so those are the components that make up the benefits that you saw earlier in the 45 to 70 percent benefits.

MR. BUTLER: Katherine.

MS. FLEMING: Yes.

MR. BUTLER: During the course of a couple of Mr. Miranda's answers, there's been some cross talk. I don't know if it's from your end

Hearing Exhibit - 000608

or others on the phone, but just if possible, everybody try to either be on mute or not say anything when the witness is responding.

MS. FLEMING: It's probably been from the other parties because this room is fairly quiet. And I know the court reporter is typing but I don't think that's what we're hearing so --

MR. BUTLER: No. That wasn't what I was hearing.

MS. FLEMING: So if all other parties could please mute your phones, again, so that while we're asking questions here, so that way I can hear the witness' response and he can hear my questions, we would appreciate it. Are we ready to move on?

MR. BUTLER: Sure.

BY MS. FLEMING:

Q Let me turn to the response to interrogatory number 38. This is a lengthy response and I'm really just focusing on the very last paragraph of the response which is on page 2 of its response, and it's about the fifth line down where you're talking about the cost effectiveness and the term "cost effectiveness," and FPL states this is a

Hearing Exhibit - 000609

different measure than the benefit-cost ratio and it's typically used where, as FPL suggests is the case here, a particular outcome is desired without necessarily being able to quantify precisely the benefits of that outcome. Do you see that?

A Yes.

Q Throughout your testimony does the term "cost effectiveness" mean benefit-cost ratio?

A No.

Q Has FPL used a consistent definition of the term "cost effectiveness" throughout its responses to the discovery that we've asked?

A I think so, yes.

Q We just needed that for clarification. Thank you. Let me have you turn to interrogatory number 40.

A Okay.

Q In this response to this interrogatory you're discussing the design tool kit and FPL states that the design tool kit focuses on evaluating and using cost-effective hardening options for each location, is that correct?

A Yes.

Q Does the design tool kit use the benefit-to-cost ratio?

Hearing Exhibit - 000610

A No.

Q Why not?

A What we are -- I'm getting back feed here.

MS. FLEMING: He's getting back feed.

MR. BUTLER: Yes. Something is happening here every time someone talks this end --

MS. FLEMING: Yeah. I can hear it now. Should we all disconnect the call and reconnect? Let's all go off the record. I'm going to disconnect the call and then have everybody dial back in within the next couple of minutes.

(Brief recess.)

BY MS. FLEMING:

Q Mr. Miranda, before the interruption I think we were discussing briefly the design tool kit and I had asked you whether the design tool kit uses a benefit-cost ratio and you stated that it did not, and I had asked you to explain why.

A The tool kit, Katherine, is designed to look at the most cost-effective way to harden our infrastructure. The overall benefits, right, the cost benefits that we refer to is really at the program level, at the hardening program level that looks at, you know, all the facilities that we're

Hearing Exhibit - 000611

touching, you know, how we're approaching the different wind zones, the frequency of storms, the intensity of storms, and those components that is where we conducted the cost-benefit ratio.

Once we are approaching the individual project level which kind of rolled up into the cost benefit, if you will. For example, once we made the decision that we want to harden all our acute-care facilities to all our hospitals that are providing emergency services, that we go about coming up with the most cost-effective way to harden that infrastructure at the individual project level.

Q So in determining -- does the design tool kit also include strategic benefits such as the availability of supply or the ease of maintenance?

A No. Again, it was focusing in that looking at from an engineering approach what engineering construction standard, if you will, you will apply to get the most cost-effective hardening initiative. For example, it goes from utilizing down guys, which would be the least cost alternative, it looks at installing intermediate poles, it looks at maybe changing out wood poles. So it goes ramping up from least cost to highest cost but we apply these proposed countermeasures at

Hearing Exhibit - 000612

each pole level to try to come up with the most cost-effective recommendation we can.

Q Thank you. At the workshops in August -- I don't know if you were there or not -- but FPL provided a spread sheet of storm hardening activities, costs and benefits, are you generally familiar with this spread sheet?

A Yes, I am.

Q Has this spread sheet been included in your testimony or your exhibits?

A It has not been included in my testimony. I do have -- I believe, hopefully, it's the same document -- as part of my documents here today.

Q Could we ask for a late-filed exhibit of that spread sheet, please?

MR. BUTLER: That's fine. Or we can just identify it as an exhibit and provide it to the court reporter. It already exists.

MS. FLEMING: Okay.

MR. BUTLER: It had been provided to you previously in a production request response, but --

MS. FLEMING: Oh, it was. Do you know which?

MR. BUTLER: I'm sorry. No. It is going

Hearing Exhibit - 000613

to be. It's responsive to your current round of discovery.

MS. FLEMING: It is responsive to our current round of discovery?

MR. BUTLER: Yeah. But we can certainly make it Exhibit 2. Why don't we just make it Exhibit 2 and we can go ahead and give you a copy.

MS. FLEMING: That would be great. Because staff obviously wants it for purposes of the record.

MR. BUTLER: Right. So, Manny, do you want to suggest a title to it there based on what's on the top of the document?

THE WITNESS: Well, it says Florida Power & Light Company storm hardening plan, is what the document says.

MR. BUTLER: Summary on --

MS. FLEMING: How about storm hardening activities cost and benefits?

MR. BUTLER: Okay. That's fine.

MS. FLEMING: That will make it clear as to what the spread sheet is.

MR. BUTLER: Fine.

(Late-Filed Exhibit 2 identified.)

BY MS. FLEMING:

Q And, Mr. Miranda, you spoke earlier about hardening initiatives that have been before the commission. Do you recall that?

A Yes.

Q So FPL provided hardening initiatives to the commission in a prior proceeding, correct?

A Can you clarify?

Q Well, the --

MR. BUTLER: Are you --

MS. FLEMING: Go ahead.

MR. BUTLER: I'm not sure what you're trying to ask him about. Are you asking about the 10-point hardening initiative docket?

MS. FLEMING: Yes, I am. That would be the prior proceeding.

BY MS. FLEMING:

Q So FPL did provide a 10-point hardening initiative to the commission in a separate docket or in a prior proceeding, correct?

A Correct.

Q And did the commission approve these hardening initiatives because it was reasonably expected to achieve reduced storm restoration cost and reduced outages?

A That's correct.

Q Now, in those hardening initiatives do you know what the estimate of the total incremental costs were for those previously approved initiatives?

A Incremental costs?

Q Yes.

A I've got the total cost here. I'm not sure. Katherine, I don't know if I have the incremental cost. I know we provided the total cost.

Q What is that total cost?

A The total cost for the 10-point plan is about $90 million.

Q Now, is there any way to get the incremental costs?

A Yes, I'm sure we can give you the incremental cost.

Q We would like that as well.

A I think the big driver there is just the vegetation piece backing out what was base vegetation cost from before. As part of that, we had submitted the incremental cost there. We have that information.

Q And what is the total incremental costs for

Hearing Exhibit - 000616

the proposed hardening plan in this docket?

A For which year? For the total?

Q In total.

A All three years. So for 2007 -- we have provided ranges for those. For 2007 and -- well, we have estimated between 48 and 62 million. For 2008 it's 75 to 125 million, and for 2009 it's 100 to 150 million.

Q Now, have you all determined what the incremental cost as a rate impact per 1,000 kilowatt hours would be for the approved initiatives, that were approved in the prior proceeding?

A The prior proceeding?

Q Yes.

A No. We have not calculated that.

Q Have you calculated what that same rate impact per 1,000 would be for the proposed hardening plan?

A I did a -- I had asked for at least a look at the 2007 cost estimates where we're estimating. Looking at what FPL -- I guess, you know, the folks that conducted the analysis for me -- from what I understand FPL for an additional $50 million of capital it has a revenue requirement of about $7 million and then, of course, the O and M is, you

Hearing Exhibit - 000617

know, one for one. And this is just illustrative of kind of what our rate structure is. But looking at the hardening estimates for 2007 we calculated about 0.13 dollars -- or 13 cents on a typical $102, kilowatt average residential bill.

MR. BUTLER: $102, thousand kilowatt hour.

THE WITNESS: Right. A hundred and two dollars which is the typical one dollar kilowatt hour.

MS. FLEMING: I would request that we get a late-filed exhibit with the incremental cost as a rate impact per one thousand kilowatts for the approved initiative as well as a separate one for the proposed hardening plan so staff can look at it and have a side-by-side comparison.

THE WITNESS: Katherine, just to make sure we're clear: we have the 10-point plan, we also had our pole inspection. Are you also including that as well?

MS. FLEMING: It is my understanding the staff was including that as well.

MR. BUTLER: Be 10-point plan, the pole inspection program, and then our proposals for

Hearing Exhibit - 000618

on infrastructure hardening in this docket.

MS. FLEMING: Yes. If we could have them either separate pages or separate columns so that way we can see what applies -- what the rate impact is per each.

MR. BUTLER: Okay.

MS. FLEMING: And that will be late -- is that Exhibit 3?

MR. BUTLER: That's what I have.

MS. FLEMING: And we could just title it rate impact for hardening initiatives, proposed hardening plan, and pole inspection.

MR. BUTLER: That's fine.

(Late-Filed Exhibit 3 identified.)

THE WITNESS: And, Katherine -- well, we're going with the back feed again.

MS. FLEMING: Oh, you are.

THE WITNESS: Can you hear me now?

MS. FLEMING: Yes, you are -- we do have an echo. Does anybody have a BlackBerry® or a cell phone on, or something that may be causing this? We're getting interference from something.

MR. SEIVER: I'm only hearing it when the witness or Mr. Butler speak, though.

MR. BUTLER: I think it is at this end.

THE WITNESS: We'll see if we can separate anything we have around me here.

MR. SEIVER: Well, that's much better.

MS. FLEMING: Do you have a watch on or some money in your pocket that might be doing that?

MR. BUTLER: If it does it again, I think we have a phone that's not as good a speaker phone but is also not as temperamental and we'll recall into that if we get the problem again.

MS. FLEMING: Okay. Well, let's just proceed and see if we can get through this.

THE WITNESS: Katherine, so the 10-point plan, which as you know included some transmission activities as well.

MS. FLEMING: Uh-huh.

THE WITNESS: Just want to make sure we're clear on that as well.

MS. FLEMING: Yes.

THE WITNESS: Okay.

BY MS. FLEMING:

Q So would you agree that the previously approved initiatives such as the 10-point plan are

Hearing Exhibit - 000620

mostly annual system-wide activities?

A Most of them are. Some of them are for example system type changes. One of them was upgrading our GIS system. A couple of them also corresponding to better forensics after a storm. So some of them also were depending, Katherine, not only -- some of them are on an annual basis, but some of them are also depending on activities following a storm.

Q And would you agree that the proposed hardening plan in this docket is more of a three-year projection that is subject to change as more information is acquired or costs are refined?

A Yes. Well, we have submitted it as per the rule 2007, 2008, 2009 hardening initiative.

Q Would you agree that the previously approved hardening initiative that the commission has approved and the hardening plan in this docket are complementary to each other?

A Yes. You know, the answer is yes. And the hardening initiative is really geared towards, you know, what we consider to be one key component. When you look at the 10-point plan it clearly addresses the vegetation concerns, it addresses the pole inspection concerns, the hardening plan as we

Hearing Exhibit - 000621

have submitted addresses one of our key findings following Hurricane Wilma which was the wind-only related activities of the damage that we saw.

Q And you would agree that the company is responsible for pursuing the most cost-effective hardening projects, correct?

A Right.

Q And would you agree that the commission expects each utility to prudently manage its resources?

A Yes.

Q Now, I know that when I asked you earlier today you didn't mention having any of the intervenor witness testimony in front of you, is that correct?

A I do not have it. I'm sure we can get it here.

Q I just have a couple of questions and I think I can paraphrase or just quote directly from their testimony. And if for some reason you do need their testimony, we could take a quick break for you to get their testimony. But let's try to work through this together for now, if that's okay with you.

A Can we just take one minute and I'm sure we

can find it here.

Q Sure.

MR. BUTLER: Whose do you want?

MS. FLEMING: Smith for AT&T, Walker for Verizon, and Harrelson for FCTA.

(Brief recess.)

BY MS. FLEMING:

Q Mr. Miranda, let's start with AT&T witness Smith's testimony. I'm looking specifically on page 3 of his testimony where he states that AT&T and the IOUs have committed or have agreed to a third-party attacher process, is that correct?

A Correct.

Q Has FPL -- since the time of the third-party attacher process agreement, it's been revised slightly, has FPL agreed to the revised third-party attacher process?

A Yes.

MR. BUTLER: Just for clarification, you're referring to the revision as to who at the commission receives the updating reports.

MS. FLEMING: Yes, that's correct.

BY MS. FLEMING:

Q In its plan FPL included some preliminary cost-benefit data that it collected from third-party

Hearing Exhibit - 000623

attachers. Since the time the plans were filed, several meetings and workshops have been held with the purpose of explaining the plans or exchanging information. Has FPL made any attempt to update the third-party attachers' cost-benefit information in this plan?

A You know, anything that would be provided to us we would provide and update. I don't think we've been provided -- or we've requested additional information.

Q FPL has not requested additional information from the third-party attachers?

A I think we requested as part of some of our -- I know as part of our interrogatories but I don't think we have received anything at this point that would update what we had provided initially.

Q So FPL may update the cost-benefit information once they receive this information from the third-party attachers.

A Sure. Anyone that provides updated information we can update our responses.

Q Thank you. FPL's plan that you filed with the commission, did it include the cost-benefit data from all third-party attachers in FPL's service territory?

Hearing Exhibit - 000624

A Say that one more time, Katherine.

Q In the plan that you filed you did include some cost-benefit data. Did FPL include the data from all third-party attachers in FPL's service territory?

A Any that we received we just provided it back in our response. We did not receive from all.

Q Did you attempt to receive information from the other third-party attachers in your service area that did not previously provide information?

A Yes.

Q And why wasn't FPL able to obtain this information?

A They did not provide responses back to our request.

Q So the third-party attachers just failed to respond to FPL's request for information, is that my understanding?

A I'm not -- I think they would maybe need to clarify why they chose not to provide the responses. We did not receive all the information of all our third parties that we could compile it and provide a complete picture.

Q So then FPL did include the cost-benefit data from the third-party attachers that you did

Hearing Exhibit - 000625

receive information from. Do you need me to rephrase?

A I said, that's correct.

Q I didn't hear you.

A Oh, sorry.

Q It might be the phone system again. Now, in general does FPL's pole joint use agreements with third-party attachers currently assign financial responsibility when a pole is overloaded or when an attachment is unauthorized?

MR. BUTLER: I'm sorry. You're going to have ask those question to the extent Mr. Miranda knows pretty much by attacher because we got different agreements with different attachers, and some I think really it's not necessarily an agreement. We got to vary by attacher.

MS. FLEMING: Give me a moment and let me figure something out. Okay?

MR. BUTLER: That's fine.

MS. FLEMING: Off the record.

(Discussion off the record.)

BY MS. FLEMING:

Q I think I'm working through this. Let's try it this way, Mr. Miranda. You're saying you

Hearing Exhibit - 000626

can't answer it specifically because the joint-use agreements vary from attachers, is that correct?

A That's correct.

Q Because it was my understanding -- and please correct me if I'm wrong -- I thought that generally speaking some joint-use agreements were similar in nature, certain aspects were similar in nature, am I incorrect?

A No, you're not incorrect.

Q Well, can we speak in general terms instead of to the specific utilities. How does FPL assign financial responsibility to third-party attachers? In general terms.

A Katherine, define financial responsibility.

Q For example, when a pole is overloaded there is obviously a cause -- a person that's causing the overload and FPL may need to upgrade its poles. So who would be responsible for the upgrade of the pole if FPL is not the reason for overloading the pole?

A Right. So if it's a case where either FPL, the cable company, or the telephone company was going to attach facilities to a pole that would cause it to become overloaded, the respective utility would be the one that would take action, so

Hearing Exhibit - 000627

would be responsible for the cost associated with overcoming the overload condition.

Q Okay. So would cost then be allocated to the causer of the overload?

A So for example, let's say cable TV is going to add a new attachment to our pole. They would ask for make-ready work. We would provide them an estimate of what it would take to correct the condition and then they would pay for that cost associated with the make-ready work.

Q And generally that's how you deal with permitted attachers. What happens if you have an unpermitted attacher on your pole?

A If we have an unpermitted?

Q Unpermitted. Someone that's unauthorized to be on the pole.

A Well, we have very strict, you know, permitting requirements. You know, as part of the 10-point plan, we also audit to make sure that no one attaches to a pole that's not supposed to be on there. But if we find an unpermitted --

Q Sir. I'm sorry, Mr. Miranda. Can you repeat that. I'm sorry about that.

A I was saying that we have as part of our 10-point plan one of the requirements is that we

conduct an audit of our facility of who is on our pole every five years. If we should find somebody that's on our pole that's unpermitted, we would pursue contacting them and they would be responsible for -- if the pole is in violation at that point, they would be responsible for making the pole meet the required, you know, criteria.

Q If during a pole inspection FPL determines that a pole is overloaded, how do you determine who is responsible for the overload?

A During the pole inspection process?

Q During pole inspection process, yes.

A We are -- one, we would make sure who is attached on there should be attached to that pole. After that, we just conduct a pole assessment, a pole analysis to see what the loading condition is. We do not look to put -- at this point we don't go back out to try to determine how the pole became overloaded at that point. As part of the pole inspection program we will at that point take corrective measures to change out the pole and then the respective parties will do their respective transfers on their facilities.

Q Thank you. Now, I would like to have you turn to Verizon witness Walker's testimony.

Hearing Exhibit - 000629

A Okay.

Q I'll looking on page 6 where witness Walker states that FPL's proposal to apply EWL throughout its distribution plan be denied, distribution plan be denied; and if EWL is to be applied at all, it should be used on a trial basis or over a limited period of time.

A Okay.

Q Do you agree with this comment?

A No. Again, you know, going back to our experiences following the '04 and '05 hurricane seasons, our customers, our public officials, clearly we needed to take action to strengthen our infrastructure to make it more resilient against the impact of future hurricanes. And the actions we are taking in our hardening initiatives is to address the wind-only component which -- as you mentioned earlier -- it's complementary, it's part of our whole hardening initiative for FPL.

Q Mr. Miranda, did you have anything else to add?

A Well, I think the other thing too is we are also being very targeted in our hardening initiatives. We are looking at it from what we call critical infrastructure, looking at key customers

Hearing Exhibit - 000630

that serve critical community needs, we're looking at community projects, and we're also doing it by wind zones. So we're being very targeted in our approach and making sure that we meet our overall objective.

Q Thank you. And lastly I'm going to have you look at FCTA witness Harrelson's testimony, please. And I'm looking specifically on page 10, lines 4 through 6.

A Okay.

Q Witness Harrelson states that certain of FPL's attachment standards and procedures in the plan do not relate to storm hardening but instead concern rate terms and conditions regulated by the FCC.

A Yes, I see that.

Q What is FPL's response to this statement?

A We provided our attachment criteria, our attachment standards as requested by the rule. We did not change anything from what I understand in our standards and our attachments.

Q So has FPL discussed this concern in negotiations with FCTA?

A Yes. From what I understand there's been discussions on this front.

Hearing Exhibit - 000631

Q Has there been any resolution on this issue?

A I would have to ask, you know, John. I know there was some back and forth on some possible language that would maybe not include the attachment standard as part of our hardening filing but that has not been resolved yet.

Q Thank you. Turning to page 24 of witness Harrelson's testimony, specifically lines 22 through 24. Witness Harrelson is discussing FPL's deployment strategy. And it's talking -- witness Harrelson is saying that there is a second deployment deficiency is that the guying effects of other power lines, communication cables, and guy wires are not taken into account by FPL in calculating the strength of poles except for the application of storm guying. Do you see that?

A Yes, I see it.

Q Do you agree with this statement?

A I do not agree that -- I agree that we have not incorporated it, Katherine, but we have -- Vickie Allison has brought this forward to our attention and we are currently in the process of evaluating what the effects of these -- the guy potential is of these communication cables.

Hearing Exhibit - 000632

But as part of our analysis, there are clearly some issues that have to be resolved. We cannot just assume that there is a direct guying effect associated with these cable TV conductors. For example, we have to understand how these conductors are attached to our poles, we have to understand what kind of slack these conductors have. There are a lot of technical issues before we can incorporate that into our standards.

However, all that said, you know, we are also very interested in the concept that we will be evaluating this concept to see if there is some benefits that can be directly associated. But it has to make sure it's technically sound with clear engineering standard and can be incorporated into our tool kit.

Q So if after all that evaluation FPL does determine that it is technically sound and it can be evaluated, then does FPL intend to include that as part of its plan?

A Yes. If we can quantify the benefits, clearly it would be something that we would incorporate into our tool kit.

Q Let me have you turn to page 27 of Harrelson's testimony, lines 19 through 23.

Hearing Exhibit - 000633

A Okay.

Q It's along the same lines about issues with the plan, and Harrelson states that the plan does not adequately describe the communities and areas within the service area where improvements are to be made. The plan also fails to provide a detailed description of the extent to which joint-use facilities are involved, an estimate of the cost and benefits to utility including the effect on storm restoration and power outages, or an estimate of the cost and benefits to third-party attachers. Do you see that?

A Yes, I see it.

Q What is FPL's response to this statement?

A Well, first for 2007 we have provided very detailed engineering designs for all our projects, for either our community projects, our critical infrastructure projects. We also provided it as well for any activity that we may have in 2007.

And from what I understand in response back from them they have received all the information that they need, that's necessary for them to perform their analysis. For 2008 and 2009 we have provided our critical infrastructure projects by a one-line diagram. We have not provided the detailed

Hearing Exhibit - 000634

engineering.

However, we have also as part of this one of those suggestions that in dealing with FCTA was to have preconstruction type meetings to where we could make sure we can look at what we're doing out in the field. We have enhanced that in the "Process within the Process" to not only have preconstruction meetings but also to have predesign meetings to be able to make sure that we have -- we incorporate any other concerns and also consider any impact we may have in our designs. So we will continue to provide them the more detailed estimate as they become available and we have always made that very clear from the very beginning.

Q So FPL is cooperating then with FCTA as far as providing the information that they need to make the determination.

A As the information becomes available, we will provide all the information we have available to them.

MS. FLEMING: Well, Mr. Miranda, those are all the questions we have. I thank you for your time today.

MR. SEIVER: This is John Seiver for FTCA. I think I'm the only other party that

Hearing Exhibit - 000635

cross noticed. Is that right, John?

MR. BUTLER: I believe so.

MS. FLEMING: I think so.

MR. O'ROARK: This is D. O'Roark with Verizon. We did not cross notice but I do have questions.

MS. FLEMING: Okay.

MR. SEIVER: Well, I'm amenable to any kind of order. I don't really have a time estimate on mine. I know it's probably going to be at least an hour. I don't know if you want to take another break, or if we should forge on ahead.

MR. BUTLER: Why don't we take a short break. And since you submitted the notice, you would probably go first.

MR. SEIVER: All right. And the only thing I would ask, John, I didn't write it down so I wasn't sure, but does the witness have the KEMA report from January '06?

MR. BUTLER: I don't think he has mentioned it but we do have a copy available for him.

MS. FLEMING: And can I interrupt for a minute for the court reporter. Can you spell

Hearing Exhibit - 000636

KEMA for us, please?

MR. BUTLER: Sure. It's an acronym, it's all caps, it's KEMA.

MS. FLEMING: Thank you, we got it.

MR. SEIVER: Should we set a time, Katherine? Does our court reporter need a break too then?

MS. FLEMING: Do you need a break?

THE COURT REPORTER: Whatever you guys want to do.

MR. BUTLER: How about 10 minutes? How about 20 till 12?

MR. SEIVER: 11:40. Okay.

MS. FLEMING: That works for us.

MR. SEIVER: We'll be back.

(Brief recess.)

CROSS EXAMINATION

BY MR. SEIVER:

Q My name is John Seiver. I'm one of the cocounsel for the Florida Cable Telecommunications Association which you probably know us by our acronym and I may use it occasionally, FCTA. And I'm going to ask you -- I'll probably be focusing mostly on your rebuttal testimony. But I will have questions about the answers to interrogatories, and

Hearing Exhibit - 000637

I may make reference to the KEMA report, and some of the other testimonies.

But if in any of my questions you need something else to refer to that's either not readily available in front of you, please let me know and I can be patient or we can just move on from there. All right?

MR. BUTLER: Right. Thank you, John.

Q Sure. Mr. Miranda, one of the things that Ms. Fleming was asking you about right at the end -- and I'm going to try not to retread, but this is just one thing to clear up, were about the guying effects of laterals and I believe storm guys being included in the loading analysis. Do you remember that question?

A Yes.

Q And you said that's something you are considering, is that right?

A Correct.

Q But I think I misunderstood your answer. You had said something about if you could quantify the benefits, then you would include it. If that's correct what did you mean by quantifying the benefits?

A John, what I was referring to is the

ability to calculate the improvement in the wind loading calculation. So for example if the guying effect was the result of a conductor let's say is perpendicular offset -- that's just make a hypothetical -- offset maybe 10 miles an hour of wind loading, right, then we would incorporate that into our wind loading analysis for that individual pole.

MS. FLEMING: Mr. --

Q Very good. I understand you now. I thought there might have been some other aspect to a benefit.

MS. FLEMING: This is Katherine Fleming, let me interject just one second. Mr. Miranda, the court reporter is having a hard time hearing you so if you could speak a little bit louder, a little bit closer to the phone, we would appreciate it.

THE WITNESS: Okay.

MS. FLEMING: Thank you.

(Discussion off the record.)

BY MR. SEIVER:

Q Mr. Miranda, I'm going to start by referring to your rebuttal testimony if you could look at page 2 of that in particular line 17 to 19.

A Yes.

Q The sentence is, customers made it clear that the scope and duration of these storm outages and the disruption to the recovery and normal functioning of their communities that the outages entailed were unacceptable. Mr. Miranda, my question is first of all how were you aware of what the customers made it clear as far as their reactions were?

A Well, we got clearly a general feedback as it relates to customers that called either during the storm, you know, concern about the restoration period. We also heard it from our public officials. And also during the storm recovery hearings where the customers had an opportunity to voice their concerns, and many came forward and brought forward their concerns about the restoration period and FPL's performance during that time.

Q Do you have any documents that would be able to, you know, summarize or pertain to what the customers said or complained about?

A As far as a roll up type summary?

Q Yes.

A I do not have that with me. I'm sure we can maybe recap some of the statements that were

Hearing Exhibit - 000640

made during the recovery, the storm recovery hearings, and just look in general, John. I don't have that in front of me.

Q Well, okay, then you might not be able to answer this question. I was going to ask you if it was mostly related to Wilma those complaints or to any of the other storms.

A I think it's as it relates to the general storm experience.

Q So the focus in that sense was not just the customers or the community's officials response to Wilma but to all the storms in the -- I guess the seven storms in that 2004-2005 hurricane season?

A Correct. Culminating with Wilma which, as you know, was the most significant event we had from a restoration period.

Q Now, we had asked about -- I had mentioned about meeting the KEMA report. Generally are you familiar with the KEMA report?

A Yes, generally.

Q And would it be fair to say you've read it -- maybe not every word -- but pretty much all the way through?

A Yes.

Q And you're familiar with the conclusions.

Hearing Exhibit - 000641

A Yes, the high-level conclusions.

Q And as far as the KEMA report -- and I believe your reference in one of your exhibits is a Davies Consulting chart -- was it ever up to you to resolve any differences or contradictions that may have existed between the KEMA report and what Davies found?

MR. BUTLER: I'll object to the form of question. You can answer it.

A John, I'm not sure I'm following your question. Can you clarify?

Q Well, my question was only to say if there's inconsistent -- I'm asking if -- if there is an inconsistency between KEMA and Davies, is that something that would have come across your desk to figure out?

A It may have.

Q Well, that's good enough. Going on to page 3 and 4 of your rebuttal. At the bottom of page 3 you start -- you talk about some of the forensic data from Wilma. And in fact you say that the forensic data from Wilma served as the basis of FPL's plan. Now, you've talked about the other -- I guess the other six storms. Did the other six storms not serve as the basis for the plan?

Hearing Exhibit - 000642

A (next part) When we looked at the Wilma forensics it really highlighted the wind only. When you look at all our hardening initiatives as a composite, you know, our hardening plan are really to address that component that were clearly identified during the Wilma storm. But the other storms, clearly, and everything else, you know, vegetation program, our full inspection program are targeting a complete comprehensive overview of all storm-related activities.

Q Right. And let's just talk about wind only for a moment. Did you or someone at FPL make a determination that it was likely to have a wind only type storm like Wilma again in the next year, or two years, or three years?

MR. BUTLER: I'll object to the form of the question. I would ask you to clarify what you mean by a wind-only storm like Wilma.

Q Well, do you understand my question, Mr. Miranda?

A Could you repeat it or clarify, John?

Q I'll clarify it. And I apologize for the siren. That's one of the problems living in Washington, D.C. With the analysis of Wilma in particular for your plan that was one of seven

Hearing Exhibit - 000643

storms, and I'm only referring to it as a, quote, wind only, end quote, storm because that's how you generally looked at it that the damage from Wilma has been in your estimation to be wind only at least as I read it, and my question was did you make some sort of a prediction or analysis that you could have a storm like Wilma again within the next year or two years or three years.

A Well, let me just clarify how you're describing a storm. You know, Wilma was, you know, clearly the wind only was a definition of the root causes, John. As you recall with the KEMA report, there were other components, other failure components in there. There were tree-related outages, there was presence of deterioration, there were multiple components. So all the hurricane strength, as you know, different profiles.

For our analysis what we did is we took the profile of the seven storms that impacted us and not just Wilma only in our benefit analysis, if you will.

Q But isn't it true that going to extreme wind for your distribution structures is based on Wilma, isn't that right?

A It was the -- the forensics identified that

Hearing Exhibit - 000644

wind only was the major driver which is the reason we proposed going to the extreme wind. However, the other hurricanes also had, you know, higher level winds. Remember, we had much better forensics during the 2005 storm season.

Q But the other storms did not have wind only as the predominant root cause of the pole breakage, right?

A Not for -- we did not conduct that forensic analysis up to that level of detail from what I understand. John, our rebuttal testimony, John, who led or forensics could probably be the best to answer that question, John.

Q I'm sorry. Who led the forensics?

A John McEvoy and his team.

Q Thank you. So as long as I understand it then you did not make any assessment in adopting -- you yourself -- in adopting or using extreme wind for the distribution poles in your service territory based on your own prediction of the likelihood of a recurrence of a Wilma storm?

MR. BUTLER: You is referring specifically to Mr. Miranda?

MR. SEIVER: Correct.

THE WITNESS: One more time, John.

Hearing Exhibit - 000645

MR. SEIVER: Court reporter, I'm sorry could you read that back for me, please.

(Pending question was read.)

A I'm sorry. I'm not following kind of the question when you're saying you.

BY MR. SEIVER:

Q Well, let me -- I'll try to rephrase it.

A I'm sorry, I'm sorry.

Q That's all right. Mr. Miranda, in your rebuttal testimony, in effect on page 4 when you're talking about the expenditures for '07 to '09 at line 12 -- I mean, sorry lines 11, 12, and 13 you speak of the expenditures are important because only by implementing the plan will FPL directly address the problem of wind only pole failures. My only question is did you -- and I mean you, Mr. Miranda -- make any assessment that there was likely going to be another storm like Wilma that would have wind-only pole failures?

MR. BUTLER: I object to the form of the question.

Q Do you understand it, Mr. Miranda?

A I think I do. I think what we based it on was that giving the profiles of -- of the wind profiles which is within the NESC, the contour maps

Hearing Exhibit - 000646

that we were reviewing earlier and the possibility that we would have storms with those wind profiles affecting our service territory that exceed our design criteria, then we felt that wind only was the key component going forward. And our forensics in Wilma confirmed that, you know, wind only can cause, you know, pole breakage.

Q Right. Okay. So you determined then that you wanted to build -- FPL wanted to build the system to a wind only type storm profile, is that right?

MR. BUTLER: I'd object to the form of the question again.

Q Do you understand it, Mr. Miranda?

A Not really.

Q Well, okay. Let me go on to another sentence. You mention on page 4 of your rebuttal you talk about implementation of the plan providing substantial benefits including fewer outages. Is that because by building to a Wilma type storm you expect there will be fewer wind-only pole failures?

A By building to the extreme wind contour maps within our territory we would expect fewer wind only type interruptions to our infrastructure.

Q So my question was: what was the basis for

Hearing Exhibit - 000647

your expectation that there was going to be another storm that would create wind-only pole failures?

A Well, the maps indicate that our probability of having wind of those level affect our territory, right, based on historical information, and our design, we just matched our design which we don't design to those limits, and we will conclude that the difference you would have wind-only related interrupt on pole breakage.

Q Well, I thought you said you did not have as good forensics for your pre-Wilma storms to be able to make a determination that there is wind-only problems with those earlier storms.

A No. What I said is if you look at the wind maps, right, the map that we were describing earlier in our discussion with Katherine, right?

Q Yes.

A That show the contours within our service territory, that show that you can have wind, you know, 145, 150, and the different contours in our service territory, those are based on historical meteorological events. And what we're saying is if history is our guide, right, then we can expect those wind profiles in our service territory going forward.

Hearing Exhibit - 000648

Q So even though of the seven storms that you mentioned only one had that profile you determined that you should build to meet that profile?

MR. BUTLER: I'm going to object to the question. It assumes facts not in evidence.

MR. SEIVER: Well, I'm not sure that I misunderstood Mr. Miranda.

BY MR. SEIVER:

Q But I thought his testimony was that they were building it to the wind to eliminate wind-only pole failures, isn't that right?

MR. BUTLER: Are you asking me or him?

MR. SEIVER: No. Mr. Miranda.

A Wind-only pole failures prior to these storms we were building to Grade B construction.

Q No. Building to extreme wind.

A John, I'm sorry.

MR. BUTLER: When? When are you saying they built to -- you mean, the current building to extreme wind?

MR. SEIVER: Yes.

A Our proposal is that we build to extreme wind.

BY MR. SEIVER:

Q I understand. And your proposing to build

Hearing Exhibit - 000649

to extreme wind in order to eliminate the effects of one of seven storms in the '04-05 time frame?

A We had the forensics, very detailed forensics during the Wilma storm where it clearly measured that wind only was a significant component, was the major component during that storm.

Q Do I need to ask Mr. McEvoy then any questions about the expectation of having that kind of a storm again within the next one, two, or three years?

A You can ask him. Again, to me, you know, the probabilities are based on the maps within the NESC --

THE COURT REPORTER: Sorry.

Q And those types of winds in your service territory have been --

THE COURT REPORTER: -- you'll have to repeat your answer.

MS. FLEMING: I'm sorry to interrupt. The witness needs to repeat it. Feitz was talking and --

THE COURT REPORTER: It really breaks my concentration, I'm sorry, when people start talking in the room.

MS. FLEMING: So I'm sorry about that.

Hearing Exhibit - 000650

All of you, hush.

MR. BUTLER: Why don't you reread the question and Mr. Miranda will answer it.

(Question and answer were read.)

A What I was referring to is the maps that we have been discussing earlier that show the different wind profiles within our service territory and that they indicate that there's a probability that we will have those winds in our territory in future years.

Q Mr. Miranda, building to extreme wind would not make sense in areas near trees, would it?

A Building to extreme wind with trees?

Q In areas near trees.

A I'm not sure that we have any data to say why we wouldn't build to extreme wind.

Q You don't have any data to show that trees provide either a shelter from the wind; or that falling trees in areas where trees are near lines are more responsible for pole failures?

A You asked two questions there, John, the first one is sheltering --

Q Yes.

A -- of wind. You know we do not have the data to support that the sheltering of trees can

mitigate the amount of wind that poles would see. You know, I know that this is something that Mickey has brought forward as a basis to consider going forward, and we have again asked for -- help us understand how to quantify that. So that was the first part of your question.

And I guess the second part of your question was the issue about falling trees. And again in our forensic we did clearly see -- we did have tree-related outages for Wilma as well.

Q And did that have an impact on your decision to build throughout the service area as opposed to areas that were not near trees?

A I'm sorry. Not following, John. The decision to build to extreme wind, right, was not corresponding to the tree-related outages. We have, as you know, as part of the 10-point plan there is a vegetation initiative there to increase the amount of trimming that we're conducting to reduce the tree-related outages following a storm.

Q Yes. And my question was as apart from that, would it not be prudent to not -- well, I'm sorry. Let me rephrase that.

In areas where the pole lines are near trees would it still be prudent to build to extreme

Hearing Exhibit - 000652

wind in your opinion?

A Yes, it would be.

Q And is that on the expectation that the trimming and vegetation management would lessen the likelihood of a tree fall on a pole or the debris?

A That would lessen it. And in addition to that by building it to extreme wind we're building a stronger line that can, you know, have a better chance of sustaining some of the damage associated with some of the tree-related outages that we see.

So not to say that a completely fallen tree over, you know -- or a huge significant tree may not cause the damage but, you know, by building it to extreme wind, we're also putting in the larger size conductors which can mitigate some of the amount of damage we might see from falling branches and those type of tree-related outages that we might see.

Q Did you also believe that building to Grade B was something that could be a benefit to helping the pole lines withstand extreme wind?

MR. BUTLER: Object to the question. Pretty unclear.

Q Let me rephrase it. Did FP&L at any time have a policy of building its distribution plant to Grade B standards as opposed to Grade C?

Hearing Exhibit - 000653

A Right.
Q I'm sorry. I didn't hear your answer.
A Yes. Yes, we did have a policy.
Q And is that policy still in effect?
A It is until we get this approved I guess.
Q Right.
A And we have really begun to implement the extreme wind.
Q As far as Grade B is concerned did you believe that it was an effective means for dealing with extreme wind events or wind-only events prior to Wilma?
A It's clear that having extreme wind -- I mean, Grade B construction is better than Grade C, and that's what the purpose of our Davies study, which was to look at the performance of our infrastructure versus, you know, other utilities that have Grade C construction.
And what we found is Grade B performs -- if we had not been designing to Grade B, we could have, for instance, seen a one-and-a-half percent pole failure, we could have maybe seen two-and-a-half to three percent. By going to extreme wind now based on the wind contours that we discussed earlier it would be more resilient against the impact of future

Hearing Exhibit - 000654

hurricanes.

Q Mr. Miranda, is the KEMA report convenient for you right now?

A Sure.

Q I would like you to turn to page 77 of that. It's near the bottom of the page in section 7.4, in the rule analysis and interpretation.

A Page 77?

Q Yes, please.

A Which paragraph, John?

Q Bottom paragraph. There is a discussion about Broward County and Palm Beach. And if you need to read other parts of the page, that's fine. But I want to ask you about the final sentence of that paragraph that says, these findings virtually eliminate the potential Grade C construction as a contributing factor. My first question is going to be: have you seen that statement before?

A Yeah, I'm sure I glanced -- I glanced through it.

Q Have you had the opportunity to look at this section and analysis where KEMA is making that statement?

A Yes, I see it now.

Q Do you agree that Grade C construction was

not a contributing factor to the failures in the storms?

A I'm not sure it's in the context here and I think -- of what that paragraph. I think what they were trying to -- I think that what they were talking about that section was not built to Grade C.

Q Well, if we look at that sentence -- two sentences above it, it says most of these recent vintage pole breakages -- which was in Palm Beach I believe -- were caused by wind only -- which is what we've been talking about -- and involved Class 2 poles which likely complied with Grade B? Do you see then that conclusion is related to a class B construction pole was failing in wind only?

A Yes.

Q And does that have any impact on your conclusion of building to extreme wind in order to eliminate wind-only failures?

A Yes, our intent, right. To build to extreme wind as a result of the Grade B construction not being able to prevent some of these outages, that they relate to wind only.

Q Had you looked at in Wilma any of the other issues about lateral poles and feeder poles being the ones more or less susceptible to wind-only

Hearing Exhibit - 000656

breakage?

A Which section are you referring to, John?

Q The next page on page 78. And then the bottom paragraph it speaks to the fact that lateral circuits are more shielded resulting in a higher impact of trees as a contributing factor. Do you see that?

A Uh-huh.

Q And it ties in with my earlier question if building to Grade B was not going to sustain maximum -- I mean, the wind-only damage, and their conclusion about lateral circuits being more shielded. Would that be relevant in your determination as to applying extreme wind to lateral circuits that are more shielded?

A Yes. John, a lot of the detailed questions that you're asking I think that John McEvoy would be the best to respond to that. You know, as far as the shielding effect I know that -- that again is something that Mickey has brought to our attention and we have said that if there's a way to quantify it and a way to apply it in a way that's consistent, that we would be willing to entertain it looking at the effects of shielding.

As you know, hurricanes the wind blows many

Hearing Exhibit - 000657

directions, and when it's north and south one moment, it can be east and west in the other, and how to quantify that effect. So in some cases the shielding applies depending on the direction the storm, and some places it doesn't apply. And not knowing in advance which way the hurricane is going to come, that's the difficulty with incorporating that type of concept into our design criteria.

Q Well, let me ask you: in the design criteria do you consider the use of storm guying as opposed to pole replacements or change out for purposes of hardening?

A Where applicable, yes.

Q Where would it be applicable?

A Well, you know, where you have the ability to guy. And as you know, guy -- you know, in order to do the storm guys you have to make sure that you have the place to anchor to the guys, the down guys, and many times we end up on private property and not have easements or abilities to set some of guy requirements. And in the places we can guy clearly it's a tool we should be using.

Q And that's because those lateral circuits might be in back yards as opposed to right of way?

A Right.

Hearing Exhibit - 000658

Q At the bottom of that page 78 there is a sentence which -- if you can help me with it. It says after the analysis: this tells us that a different pole type is an alternative engineering solution is not to be recommended and that brittleness of CCA poles if any is not a decisive factor. What is a CCA pole, first of all?

A Just a type of treatment that we utilize to -- on our wood preservative.

Q I see. And is that distinct from the creosote?

A That's correct.

Q And does this -- this is just with respect to wood poles, they're not discussing concrete here, is that right?

A It's concerning the wood poles.

Q And is your proposal and your storm hardening plan to replace wood poles with concrete poles?

A It is part of our tool kit, again. And in many cases, John, what we look for is which is the least cost alternative. So for example, you know, you can add an intermediate pole that can relieve the adjacent pole. And in some cases we replace a wood pole with a bigger wood class pole. And if

Hearing Exhibit - 000659

those solutions don't meet the wind profile, then the concrete poles come into our tool kit.

Q Earlier in the report -- I want to just ask you if this is something that's significant -- if you would turn back to page 45 of the KEMA report, it's section 5.7, conclusions. These have to do with your transmission lines. I'm particularly interested in the second to last paragraph, that first sentence where they talk about transmission structural damage that most occurred on single-pole, unguyed wood structures. And the transmission poles are built to extreme wind, is that right?

A They're built to extreme wind at the time that the standard was in place.

Q So the failure of a single pole, unguyed, extreme-wind wood structure was the failure that occurred during Wilma, is that right?

MR. BUTLER: I object to the question; object to the form of the question.

Q Did I make that too convoluted for you, Mr. Miranda?

A I think I understand. But a couple of things here, first, I am not our transmission subject matter expert. I -- as you know, my testimony is really as it relates to distribution.

Hearing Exhibit - 000660

Q All right. Because there was a single-pole wood structure as opposed to a lattice tower, I thought this might have been something you knew about. But I'll move on.

Mr. Miranda, on page 4 of your rebuttal testimony you mentioned also in lines 15 and 16 about the benefits to customers which would include fewer outages, reduced restoration time, and quicker return of essential community services. Just so I understand it the plan, though, these benefits would necessarily only be realized if you had a storm like Wilma that had the wind only type damages?

MR. BUTLER: Objection to the form of the question.

Q Do you understand me? Am I right on that or am I wrong?

A No. The benefits would apply to all storms.

Q But if you continued your other efforts, the vegetation management and other hardening efforts besides building to extreme wind, if there was a storm other than a Wilma type storm, you would still get all these same benefits, wouldn't you?

MR. BUTLER: I'm sorry. What do you mean by Wilma type storm. That's the thing that's

Hearing Exhibit - 000661

leading to my continuing objection.

MR. SEIVER: Well --

MR. BUTLER: You seem to be talking past each other here.

MR. SEIVER: Well, that might be my problem and I apologize. The reason that I'm talking about the Wilma type storm is because Wilma played such an important factor in the development of the extreme-wind decision to build. I mean, I see that you couldn't ignore the effect of Wilma and the wind only being the predominant --

MR. BUTLER: What are you saying that makes it wind only like storm? Before he answers the question I need to know what you're asking him when you say a storm like Wilma. Are you talking about the wind speed, you're talking about something else?

MR. SEIVER: Yes. I'm talking about the wind speed. And not only just the wind speed but the way Wilma hit. I mean, there were six or seven storms and only one of them was named Wilma and only one of them had the Wilma forensics of wind speed and pole breakage that we're talking about based on wind only.

Hearing Exhibit - 000662

So that's what I'm -- you know, my point which I'm not disguising is that we're being asked -- or you're asking to adopt a plan that is built to one of seven storms, which I know was an extreme storm. But I'm trying to determine if there are still benefits without going to extreme wind for the other non-Wilma storms if those are repeated. So with that explanation I can try to recast my question.

BY MR. SEIVER:

Q Would there not be still substantial benefits to your customers including fewer outages, reduced restoration times, and quicker return of essential community services as well as day-to-day reliability through other storm hardening efforts besides going to extreme wind?

A John, I think, you know, our building to extreme wind, working with all the other programs such as vegetation trimming, more pole inspections, but I think it's important that we recognize that, you know, some of these other storms -- anytime your wind profile of any storm exceeds your design you have an exposure to wind only type failures. And by looking again back to that anchor map of the probabilities, the probability of our territory

Hearing Exhibit - 000663

being impacted by these type of winds is what we're basing going forward.

Wilma was the storm that based on our forensics clearly identified that wind only was a major contributor. So going forward the possibilities of having wind exceed, the hurricane wind speed path exceed our design criteria, which is currently the Grade B is based on that map and, therefore, that's why we propose going to extreme wind to say we got to build to this new criteria.

Q But if the forensics show that a hurricane with the wind speeds of Wilma would not hit your service territory for 10 years would you still want to build to extreme wind now?

A No. There --

MR. BUTLER: I'm sorry. The forensics show that?

MR. SEIVER: Or some prediction, some meteorological prediction would show that type of storm would not occur for another 10 years, let's say.

MR. BUTLER: Your hypothetical is that there is some meteorological prediction that there wouldn't be a storm of Wilma wind strength for 10 years?

Hearing Exhibit - 000664

MR. SEIVER: That is correct.

A I'm not sure that there is any evidence -- I mean, you look at all the industry experts and forecasters and everybody saying we're in heightened hurricane activity. So the basis for the hypothetical, I don't know, you know, when a storm is going to impact us. What I do know that any one storm that impacts our territory we have to be ready for. We cannot have a repeat of our Hurricane Wilma performance.

Q Well, did any of the other investor-owned utilities in Florida adopt extreme wind, to your knowledge?

A I think that some have moved up from their current grade construction and some have piloted projects to build to extreme wind.

Q But nobody has adopted it to the extent that Florida Power & Light has, is that right?

A As far as I know, no. But again we are the ones that had the direct experience with the '04 and '05 hurricane seasons. So they have to make their own decisions based on facts they have available to them.

Q Mr. Miranda, back to your rebuttal testimony. One of the questions on -- a comment you

Hearing Exhibit - 000665

made on page 5 about Mr. Harrelson was comparing the expenses of TECO's storm hardening expenditures with yours and talking about the square miles for TECO versus square miles for FPL and the number of customers. Do you see that?

A Yes.

Q Do you know what the density is of your service area compared to the density of TECO's?

A No, I do not.

Q Down at the bottom of page 5, line 22 and 23, you state that regarding the benefits of FPL's plan, Mr. Harrelson's position is again based on skewing the data in favor of his position. Mr. Miranda, I'm not sure where you are talking about skewing before. You do mention the word "exaggerating" up above. But why do you think Mr. Harrelson would be motivated to skew the data in favor of his position?

A Well, my response was as it related to using the upper limit of our ranges, and as far as the FPL and TECO territory, you know, we have -- you know, I'm not sure in his statement that he understood our densities as well as TECO's either. So all we were just saying is what the response to his comment was -- you know, he was saying that

Hearing Exhibit - 000666

there was five times as great expenditure, if I recall, and all we were saying is that look at our number of customers, look at our number of geographical areas, look at the number of facilities, this is about six-and-a-half, seven times as big as TECO's service territory.

Q Well, he didn't skew the data, he was using your data, wasn't he?

A He used the upper end of the data and not used -- he did not also give a fair -- the lower end profile either.

Q Well, as far as the costs and benefits didn't -- wasn't it FPL's own estimate that the benefits may be as low as 45 cents I believe on every dollar spent?

A The rest of --

MR. BUTLER: I object to the question as argumentative.

Q Well, was that one of the ranges of benefits compared to the expenditures that was made by FP&L?

A It was the lower end of the range for the benefit and the higher end of the range for the cost, that was the context of my statement.

Q So there is no skewing. You're just

Hearing Exhibit - 000667

thinking it's a faulty comparison.

A He was using the two extremes.

Q Also, if you move on to page 6 at line 6 you make a statement about the frequency of storms impacting FPL's service territory, the intensity of the storms. And let me just focus on that. Just so I understand it, this was not based on any prediction you yourself made as to future storms, is that right?

MR. BUTLER: Meaning did Mr. Miranda make the projections himself?

MR. SEIVER: Correct.

A Did I make -- let me read the context here.

BY MR. SEIVER:

Q I don't mean to -- I was just trying to speed it up. Maybe I messed up here by -- the whole sentence is you mention as you discussed in your direct testimony that there are several factors that affect the amount of actual restoration cost savings and these factors I believe you mean when you say including are the frequency of the storms, and the intensity of the storms.

A That's correct.

Q And the question that I have is: did you make the determination as to the frequency or

intensity of future storms?

A Well, for the purposes of the benefit analysis we gave you two ranges, we said a storm effect of every three years, and a storm effect of every five years.

Q And what was the basis for making the estimate that the storm -- you would have every three years or every five years?

A We just used as a heightened hurricane activity and just used it as a foundation by which we conduct our benefit analysis.

Q Well, further down you do make a point on line 10 that it is impossible for FPL or anyone else to predict the outcome of any of those factors. And I presume that means the frequency or intensity of storms, is that right?

A Right.

Q But then you go on to say that you noted previously the experience of the '04-05 hurricane season as well as some recent meteorological analyses suggested more frequent storm activity may be more representative. Now, this is what I was asking about before: what are these recent meteorological analyses?

A Well, from what I understand -- and we can

Hearing Exhibit - 000669

look at the detailed data -- but historical is about a storm every five years, and because we're in a heightened hurricane activity, you know, based on what forecasters are saying and the activities we saw in '04-05, that's why we went ahead and conducted the analysis of a storm every three years.

Q Would it be fair to say that the prediction or the correctness of a prediction as to when a storm -- I mean, let me start over again.

Would it be fair to say that a prediction as to the frequency and intensity of storms impacting FPL service territory within the next five years has a very significant impact on the cost-benefit analysis?

A Yes.

Q In line 15 you say a Hurricane Wilma event occurring once every three years will result in restoration cost savings becoming approximately equal to hardening costs, is that right?

A Right.

Q But I presume then if it was once every five years that it would drop to a little less than half, is that right?

A Correct.

Q And I presume if it was more than five

Hearing Exhibit - 000670

years out it would drop even lower, is that right?

A Yes. It also works in reverse, you know, if we have storms that are much more frequent and more storms, the benefits, you know, obviously grow. So, you know, not knowing exactly what that, you know, number of hurricanes is, it's why we gave that range of three years to five years. If we have a very active storm season like in '04 and '05 clearly the benefits would outweigh the cost, the cost investment.

Q And also so I can understand it based on what Mr. Butler was objecting to what did you mean by a Hurricane Wilma event?

A The intensity and the path of that storm.

Q Of a high wind storm or different kind of storm?

A Of a category 3 hurricane impacting our territory.

Q But as far as you know you haven't yourself looked at the meteorological predictions to determine when or where the next category 3 storms may hit Florida?

A Again, I think we anchored our analysis based on the map that we had been discussing earlier that has a historical wind profile for our service

territory and that the anchor by which we selected the extreme wind. So the probability of getting struck with a 145-mile-an-hour storm in south Florida, right, is greater than being struck with a storm up north. That's why we had different wind zones. Again, it's anchored on the historical data by which we anchored on the extreme wind.

Q And you do say further down in line 20 that your plan -- and you also say the commission's rule -- but your plan was not motivated strictly by a cost -- benefit-cost analysis. Do you see that?

A Yes.

Q That you're responding to a strong public outcry.

A Yes.

Q And did you make a determination of the amount of money that could be spent in order to quell fewer public outcry in doing a separate cost-benefit analysis

A A separate cost-benefit analysis for the public outcry?

Q Yes.

A No, we did not. We calculated the benefits associated with -- directly as it relates to our investment in hardening.

Hearing Exhibit - 000672

Q Do you believe that the lessening of public outcry justifies maybe a little more expenditure than you normally would if there wasn't a public outcry over the outages?

A Yeah.

Q I'm sorry. Was that yes?

A Yeah.

Q Okay. Thank you. Going on to page 7 near the top, you are -- I guess it starts at the bottom of page 6. And you talk about limited information is available. You don't believe that the public strong interest would be well served by doing nothing or doing only minimal pilot projects until complete information is ultimately available at some point in the indefinite future. Do you see that?

A Yes.

Q Well, has anybody suggested doing nothing?

A I'm not sure what others -- some have very limited, some have minimal, if any.

Q Well, I just wanted to know why you said -- you know, I think everybody would agree we're not served by doing nothing but I didn't know if somebody had actually suggested that.

MR. BUTLER: Objection; and it's argumentative.

Q Thank you. I don't expect an answer. In the parenthetical when you say minimal pilot projects are there some more substantial pilot projects that you would consider to be beneficial?

A We considered going forward with the plan as we have outlined to be the right step for FPL.

Q You didn't think you should do some pilot projects and see the results before deploying extreme wind throughout your service territory?

A Well, we are -- as you know, this is a gradual implementation of our storm hardening plan, and should we get impacted by a storm, we will again conduct forensics on what we've hardened and continue to fine tune and improve on those changes that were implemented.

Q Well, why did you say indefinite future then since there are going to be results every year when there's a hurricane season?

A Earlier -- I guess, again, we don't know when we're going to get impacted by a hurricane. You know, we know that on average it's every five years but, you know, we might get impacted sooner. But we need to be sure that we're taking actions to mitigate the amount of damage that our customers are seeing, you know. And as you saw we're

Hearing Exhibit - 000674

concentrating our critical infrastructure, those customers that really serve key community needs such as our hospitals, and 911 centers, and so forth.

Q If you would turn to page 8 of your rebuttal Mr. Miranda. And I know I haven't been going quite an hour. I should have told you if you have interest in taking a break for any reason at any time, just please let me know and I can hold up on my questioning.

MR. BUTLER: John.

MR. SEIVER: Yes, sir.

MR. BUTLER: Let me ask you: how much more do you expect to have on -- if it's going to be a while, and particularly if there's anybody else who plans to ask questions, I would like to take a lunch break at some point. I don't want to just keep going well into the afternoon if we're going to do that.

MR. SEIVER: I think I'd be finished in less than an hour. In fact I think I'm through my hardest part.

MR. BUTLER: You have been going almost an hour. Do you need one more hour?

MR. SEIVER: Yes.

MR. BUTLER: Well, then I think we're

Hearing Exhibit - 000675

clearly at a point where whenever you reach a convenient stopping point within say the next 15, 20 minutes, I would like to take a lunch break.

MR. SEIVER: I can do it now. If everybody would want to do -- if you want me to do it now or I could just keep going.

MR. BUTLER: Now, would be fine.

(Discussion off the record.)

(Luncheon recess.)

MR. YOUNG: Mr. Young, here for Fleming.

BY MR. SEIVER:

Q Good afternoon, Mr. Miranda. One set of questions I want to ask you had to do with part of your rebuttal testimony on page 11.

A Okay.

Q And I think you had been talking about your Exhibit MBM-3 with Ms. Fleming. Is that the Davies Consulting analysis?

A Yes.

Q And there's a statement in line 6 to 7. That exhibit indicates that FPL's Grade B poles consistently perform better than Grade C in storm conditions.

A Of the utilities that were compared.

Hearing Exhibit - 000676

Q Of the utilities that were compared. I see. Well, that's helpful. And also in storm conditions that wasn't just Wilma that was all the storms.

A That was all our storms.

Q And that these are Grade B, not extreme wind poles, is that right?

A Correct.

Q In some instances does Grade B construction equal or exceed what would be extreme wind for Grade C?

A For Grade C -- the extreme wind Grade C definition, John, is that what you're referring to?

Q Yes, I am.

A Grade B exceeds --

Q Meet or exceeds.

A In some cases, yes.

Q Has that been something that FPL has examined as a possible part of its storm hardening plan to build everything to Grade B?

A To Grade B, John? I'm sorry.

Q Yes. Is it breaking up on me?

A No, no. You said Grade B. We currently build to Grade B combined ice and wind, right? Were you referring to Grade C, extreme wind?

Q Yes, I was. I'm sorry.

A We are currently looking at just the extreme wind Grade B at this point. As far as the incremental hardening approach that we're taking, you know, where we are looking at the weak link, we're also looking at the extreme wind Grade C. But right now we have -- our plan is to build the extreme wind Grade B.

Q And does this include changing out what would otherwise be sound Grade C poles or even Grade B poles?

A Again, the soundness of the pole is not really what drives the decision to change out a pole. It's based on the wind profile of the pole. So you can have a -- let's say, a Class 5 wood pole, right, that is sound, but because of the equipment that's on there, the attachments, would not meet the extreme wind criteria. So you would change out that pole for that reason, not because of the soundness.

Q Would you be targeting poles under the ground line inspection program that would appear to have more issues with rot or deterioration as opposed to other poles?

A Repeat the question, John.

Q As far as the timing of replacement of

Hearing Exhibit - 000678

existing poles that might not meet the extreme wind standards for Grade B, would you be changing out poles under the ground line inspection program first that come up as being either defective or deteriorating before other poles?

A Well, I think we are addressing them in parallel. We have our pole inspection program that's running concurrent to our hardening initiatives. Now, as part of our hardening initiative, when we are hardening a circuit we also inspect the poles that stay behind, you know, that we're not replacing, John, to make sure that from a deterioration perspective that they pass the strength requirements. Does that clarify it?

Q Yes, I think so.

A Okay.

Q One thing that we had talked about before which comes up on that page 11 is about a Grade B consistently performing than Grade C. For all the utilities that they looked at, not just yours, do you remember our discussion with part of the KEMA report where there was a comment that the Grade C did not contribute to pole failures?

A Yes. Well, I understand -- again, I think they were looking at the poles that were there, you

know, I think there was some question of whether they were Grade C or Grade B construction.

Q If you go on the KEMA report now, if you got that still handy, if you could go to page 85 which is in the conclusion section.

MR. BUTLER: John.

MR. SEIVER: Yes, sir.

MR. BUTLER: While he is looking for that page let me ask you: we were able to identify essentially a document that has been produced in discovery to you but I want to be sure this is what you're looking for on this permit application process manual.

MR. SEIVER: Yes.

MR. BUTLER: The cover of it reads FPL directory and permit application process manual for use by CATV companies and non-LEC telecom companies, May 2005.

MR. SEIVER: Well, I don't have that cover page because I just have page 27.

MR. BUTLER: Does page 27 begin with a short paragraph that starts, all conductor and equipment moments are added together?

MR. SEIVER: No.

MR. BUTLER: Then we don't have the same

Hearing Exhibit - 000680

thing that you're looking at.

MR. SEIVER: We're going to look too. We can resume if Manny's found the KEMA report page

THE WITNESS: I'm on page 85.

BY MR. SEIVER:

Q Mr. Miranda, if you look on page 85 at the third paragraph, it says distribution performance.

A Yes.

Q There's a sentence that says FPL pole performance during nonhurricane conditions is good. Let me just ask you: nonhurricane conditions just mean everything other than hurricanes, is that right?

A Correct. General reliability.

Q Just general reliability overall of the plant.

A Correct.

Q In the next sentence it says, distribution pole performance during Wilma is known to be acceptable since FPL gathered extensive forensic data on Wilma pole failures. Were you aware that KEMA thought that the distribution pole performance during Wilma was acceptable?

A I think as it relates to the system

Hearing Exhibit - 000681

performed at the way it was designed to perform. I think that's what they were referring to. You know, if you look at our standards, our standards meet or exceed all industry standards, and the performance of our pole failure was in line with our expected design.

Q Well, did KEMA to your knowledge make a recommendation that you change your construction standards to go to extreme wind as opposed to maintaining your current Grade B?

A Again, I think the purpose of this KEMA analysis was to identify the root cause of what occurred during Wilma and the forensics that were identified. The subsequent decision to go to extreme wind was made subsequent to this analysis.

Q If you would just turn back to page 78. If you'll remember, we talked about this before in the report that last sentence where it talks about different pole type as an alternative engineering solution.

A Yes.

Q Your reliance subsequent to the KEMA report on the Davies analysis and your own conclusions are that you do want to change pole type, is that right?

A Again, we're not proposing to change pole

Hearing Exhibit - 000682

type. Wood poles will be a -- still a key component of our hardening initiatives. What I refer to is that we will utilize our tool kit, John, to look at the most cost-effective way to harden our infrastructure, which in some cases it's the wood intermediate poles, in some cases -- you know, that we talked about -- that's going to the bigger class wood poles, and in some cases just go to concrete.

We are also evaluating other types of poles. We're evaluating composite poles. But in how you apply those poles in the different circumstances that we're -- that's the post important thing. But wood poles will still be a key part of our hardening initiatives.

Q And you had mentioned -- we had been talking about the benefit of the plan for a third-party attachers just generally. I think that's on page 4 of your rebuttal testimony. If you could flip back to that.

A I'm on page 4.

Q I neglected to ask you that bottom last sentence there at line 18 and 19 after you list the benefits, you say most of those benefits will work for the advantage of third parties. I was just wondering if you thought there was a particular

benefit that would not work to the benefit of third-party attachers in that list?

A You mean as it relates to hardening?

Q Yes, that's correct.

A Yeah. I would think that, you know, the benefits that, as we harden our infrastructure, should be also benefits that the third-party attachers should see.

Q I'm just trying to ask you, you used the term "most." I didn't know if you were just, you know, saying most as a way of saying an expression at the beginning of a sentence or if you thought that there was some other benefit that would not be a benefit for the third-party attachers.

A You know, again, I think, you know, not knowing your business completely, you know, there may be some circumstances. But based on what we know, you know, and the benefits of during a storm event where, you know, the poles come down and fall on the ground, you know, we see your conductors down as well, and we know that there's direct benefit for those poles to stay up for you during a hurricane event.

Q If you could move on to page 12 of your rebuttal.

Hearing Exhibit - 000684

A Okay.

Q If you look at line 16 or 17 -- and whenever I tell you to look at this, you're obviously free to look at, you know, preceding and subsequent lines, or anything else you need -- but there is a sentence there that says FPL does not expect the impact on cable operators to be significant. And these refer to the costs associated with pole replacements and new intermediate poles. Do you see that?

A Yes.

Q Well, I had some questions about that. And does this, the cost that you are talking about to not be -- or the impact not to be significant, costs include the activities related to your 10-point initiative as well as the storm plan?

A This is as it relates to our hardening initiatives.

Q Just the hardening; not the eight-year inspection or the 10-point initiative.

A Right.

Q Have you done an estimate of what the impact would be on cable operators for the 10-point initiative and the eight-year inspection plan?

A No, we have not.

Q And so when there was a projection that rental rates would increase by about a dollar for the three-year period would it be fair to say that didn't include the 10-point initiative and/or the eight-year pole inspection plan?

A No. This was strictly as it relates to the hardening initiatives.

Q And was there any analysis in determining the impact on cable operators as to make ready in general as opposed to the precise storm hardening initiative?

A Well, I think the -- quantifying the cost, I don't think we have quantified the cost. We have had numerous discussions with members of FCTA to discuss how we would approach the make ready type work.

Q And is it fair to say it's going to up by a certain percentage?

A Again, John, I don't know the percentage. I know that what we have stated is that as it relates to let's say the pole inspection program, that we will evaluate the make-ready work based on the state of that circuit that they're attaching to. So for example if the circuit has already been built to extreme wind, we would analyze the make-

Hearing Exhibit - 000686

ready work against the extreme wind criteria. And everyone agreed that we would not want to have something that's been built to extreme wind be deteriorated by adding attachments to it at that point.

In the cases where the circuit had not been upgraded we would evaluate it against Grade B construction. And based on that evaluation then, you know, we would make the appropriate determination as to whether make ready type work would be required.

Q Thank you. I got two follow ups to that. The first being is: have we discussed maybe importing the eight-year inspection plan into the "Process within the Process" so there is consultation on those make-ready and change-out issues?

A You mean on the pole inspection or the make-ready work? There were two things you mentioned there.

Q Right, I did. And I'm sorry. But just the "Process within the Process" do you think both of those would be included within the "Process within the Process"?

A The way we have written the "Process

Hearing Exhibit - 000687

within the Process" is it's not included within that. Typically -- and the reason I think for a lot of that, John, is that the pole inspection type work is typically, you know -- grand majority of it is replacing a pole for a pole at the same location. Typically we are not doing, you know, reconductoring type work, you know, we are just replacing the pole with a different -- with a new criteria pole that we're putting in.

Q Right. But then you will replace it with what would be a Grade B extreme wind pole.

A We would put it with a bigger class wood pole that we've outlined in our design guidelines.

Q And that will be engineered to include the third-party attachment?

A Yeah. Well, we change out our pole, right, it would be -- make sure that it would be put in place to meet whatever overload condition we may have -- whatever we would build it to, you know, replace that pole with our new design guidelines.

Q Now, when you set new poles generally have you engineered them for the presence of third-party attachments?

A Typically when we do, let's say, new construction we do not plan ahead if you will to try

Hearing Exhibit - 000688

to reserve space for cable type installations coming in the future.

Q How about for a telephone?

A Not for them either. We typically -- it's built to our needs now. Whether there is sometimes enough strength on that pole to -- let's say if a telephone comes or a cable comes later, right, you know, then we evaluate it, and if there is strength, we can just go ahead and straightforward attach.

Q If you would look -- if you have the KEMA report in front of you still, if you go to page 88, and you'll see that starting on page 86 there is an appendix where they're doing a survey to the facilities.

A Uh-huh.

Q And they -- inquiries there. And I don't know whether FPL was a respondent, I would presume they were, but on page 88 the bottom -- I mean, paragraph number 7, does design standard for new poll allow for foreign or joint-use attachments in the loading criteria. Do you agree with me that foreign attachments would be the same thing as a third-party attachment?

A Yes.

Q And the first bullet says nominal are taken

into account, the second, that the standard pole height class is predrilled for joint users, and then the last four say yes, one of them being yes, if joint use is planned. Do you know if one of those would relate to FPL? Would be a response --

A I don't have that in front of me, John, who the respondents were. And, again, you know, I think we work closely with all parties and if we know that we're building a line, you know, somewhere in an established area, you know, most likely -- even our current design criteria incorporates some of that.

But I don't think it covers all circumstances, John. That would be kind of my pause, if you will. Is there some nominal value on that pole that has some strength that could carry some, probably. All right. But I don't think it covers all circumstances. And even all the folks that put here, I don't think any of them could probably say, you know, we thought of the worse case for the joint-use attacher.

Q Thank you. That's very helpful.

A Does that clarify it?

Q Yes, that was very helpful. The other issue that comes to mind -- and tell me if you can agree or disagree with this general statement --

Hearing Exhibit - 000690

would it be fair to say that electric attachments: facilities, and the conductors, transformers, and the other equipment that's used for your distribution on a distribution pole puts more of a load on the pole than a cable operator's strand and overlash coaxial cable attachment?

A I think in general, yes. But I imagine there are circumstances, you know, where we have very little on a pole and you might mean your -- or telephone may be the larger component of what's on that pole. But as a general rule I think it's a fair summary.

Q And are you familiar with the number of attaching entities in your service area besides obviously yourself? Is it generally there's one cable operator, and one telephone company, two telephone companies, two cable operators? Do you have any general answer on that?

A I think it varies depending on where you're at.

Q And in your relationship with the cable operators you generally rent them one foot of space, is that right? Are you familiar with the cable operators joint --

A I don't have enough knowledge of the

Hearing Exhibit - 000691

details you're asking, the specifics and all that.

Q And I was going to ask if you know whether your relationship with the phone companies under a joint-use agreement, whether they have one foot, two foot, or more space that they rent?

A Again, I don't have that before me, exactly what the agreements are for both the cable and the telephone companies.

Q In the rebuttal testimony you were testifying on 16 about overlashing, and in particular you're talking here about Mr. Harrelson's alternative overlashing proposal.

A Yes.

Q You put in quotes on a characterization of it buy-right-now and fix-later approach. Do you think that the cable operators would want to cause a violation and not have a pole be compliant with the NESC?

A I would hope their objective would be not to be in violation.

Q Do you trust the cable operator in an overlashing situation to make the necessary calculations on their own as to whether make ready is necessary before they do an overlash?

A We expect them to do the overlashing

calculation. And I think what Mickey was implying that even after the calculation was made that they would still would want to go ahead and attach. That was the implications that I understood in his proposal.

Q And, you know, you mentioned that FPL has been requiring load assessments for 10-plus years. Has FPL been requiring permits before overlashing?

A Yes. I know we had this discussion before on the term. Yes, we have required permits, yes, before you attach to our facilities.

Q Has that been enforced rigorously in the field in those 10-plus years in the past?

A I can't answer directly how it's been enforced. I know it's been just our policy and our attachment requirements.

Q Are you aware that there have been overlash attachments that have been either noticed to FP&L or made aware to FP&L that have not been permitted but without an objection from FP&L?

MR. BUTLER: Objection; form of the question.

A The answer is I am not aware of whether there has been on there hasn't been. Whether they should be or shouldn't be is really what I was

Hearing Exhibit - 000693

addressing.

MR. SEIVER: And, John, have you been able to find those two pages I mentioned from the permit application process manual?

MR. BUTLER: I think we have. Let me see if I can calibrate this. It turns out -- it seems like that the numbering on what Mr. Harrelson had sent is off by one number. So let me check now and see. What you have as page 27 starts with, the wind loading portion of an attachment permit.

MR. SEIVER: That's exactly right.

MR. BUTLER: And then what you have is an unnumbered page begins, a few wind load calculation sheets.

MR. SEIVER: That's correct.

MR. BUTLER: Okay. Well, in the discovery response that we sent to you those are actually pages 28 and 29, and Bate's number FPL 240 and 241. But just with that clarified on the record I'll show Mr. Miranda copies of what Mr. Harrelson had sent and you can use the page numbering there if you want to.

MR. SEIVER: I'll use FPL 240 and FPL 241.

BY MR. SEIVER:

Hearing Exhibit - 000694

Q Mr. Miranda, if you'll look at what Mr. Butler gave you which is a discovery response with a Bate stamp FPL 240. Do you recognize that page?

A I have not reviewed this page.

Q Okay. So all right. Just have to give me a moment. I thought we had cited something in this manual on page -- you had referred to it I thought. Well, if you look on page 15 of your rebuttal, the manual, you said when read in its entirety you require a load assessment for each pole, do you see that on page 15 of your testimony, lines 6 and 7?

A Yes.

Q But is it your understanding that this is not something to do with a load assessment?

A It's my understanding it's part of the load assessment. Let me review the page real quickly for you.

Q And, particularly, if not the third indented one, it's the second indented paragraph that starts that the wind load calculated and in particular I'm looking at the last sentence of that solid paragraph before calculating the maximum span length. Just let me know when you're done reading.

A I've read that paragraph, go ahead.

Q Do you agree with me that at least that last sentence suggests that they're going to be -- there could be situations where a load assessment on each individual pole would not be required?

A Yes. It says that they're all identical in nature. Right?

Q Well, I'm not sure it says identical in nature. I think it says relatively uniform.

A Right. Well, okay. Our interpretation. You know, I guess, I'm looking at -- you know, at the end of the day, John, I guess what we're looking at is that if we have a pole light out there, I guess what you're asking is if we have three or four poles that are identical in frame, and identical in span distances, and identical in loading do you have to do one calculation or three calculations. I guess that's where you're heading.

Q Well, I appreciate that. Not exactly. But I'm just trying to understand if the manual that we're talking about requires or does not require a load assessment for each pole, and my -- I presume the answer is it does not but only in this limited circumstance as you've described.

A I think as defined here, it's very limited in nature, but I think what we're trying to get to

Hearing Exhibit - 000696

is that, you know, based -- every pole seems to have some uniqueness on it, or some small variation, and it's very difficult without at least taking span distances -- you know, it's hard to judge a span distance when you're standing at one pole versus the next to say it's identical in separation. In order to even get to the point of not having to do the calculation you have to look at what's on the pole, you have to look at the span distances, and you have to go through all the motions to determine that this pole is comparable to your next pole. And that -- so in a way you are doing the calculation at that location.

Q I understand. All right. Well, thank you, Mr. Miranda. As far as the engineering for make ready goes on an installation, if we take a pole that has been made ready for a cable operator's attachment that you would understand normally as a metal strand with a through bolt and then an overlashed coaxial cable conductor -- well, let me ask you, is that assumption -- are we on the same page?

A That's what I understand, yes.

Q And the cable operator wishes to overlash a fiber optic bundle single conductor, and I think

Hearing Exhibit - 000697

we've talked about it in some of the other ones. A typical one is what? A little bit larger than a half-inch diameter.

A Okay.

Q And I know that there are different span lengths, and I know that there are different engineering requirements for different poles, but in your experience has the addition or would the addition of an overlash fiber optic connector alone on a pole that's been permitted and authorized already for existing strand and coaxial cable be right at the point of pushing the pole out of compliance and overloading it?

A Again, you know, I don't want to speculate on whether it's on the edge or not. All we're asking is that we do a calculation at that location, and if it is, then let's go ahead and take proactive measures to address that pole. If it isn't, which in your case you're saying the majority of them will not be what tips the scale, then it shouldn't be -- you know, from my understanding the approach that we've had with our folks who do the calculations it's been a pretty seamless type process that we both have worked through over the years.

Q And if we've been permitted to have an

Hearing Exhibit - 000698

overlash and we delash a conductor and overlash the same size conductor, would you agree that should have no impact on the pole --

A Yes.

Q -- from a loading analysis?

A If the loading analysis, John, is equivalent to what was there, then -- you know, again -- again, it's almost the same point I made earlier. You're going about calculating it to understand what you've done -- what you've undone and what you've done. And if in the cases where it's neutral then, you know, that's where we can work with you to go through a notification process. But what we don't want is where you overload -- where it has the potential to overload, if you will, and that's what we don't want to put any infrastructure in an overload situation.

Q I understand. Do you have any documents or studies or anything that you can share with us -- and I'll even make it anecdotal -- of cable operators overlashed -- and that means beyond the coaxial cable, but of the fiber optic cables or other cables -- of putting a pole out of compliance with the NESC?

A I do not have firsthand knowledge of that.

Hearing Exhibit - 000699

We have a department that conducts the make-ready work and does those evaluations. And, you know, so they would be the one -- and in many cases you would have record of cases where -- where you're overlashing whether it required make ready type work.

Q And would it be fair to say that in your position with FPL if a cable operator's overlash had put the pole out of compliance so that some remedial work needed to be done, you would be aware of it?

A No, I would not. Again, that is normal daily operations, John, where we have make-ready work that comes to us, as you know, on a regular basis not only from, you know, your customers but all customers, and that goes through a department that conducts the make-ready analysis and if make ready is required, they will engineer it and the work will be performed. I'm not down to that individual work order level.

Q And are you also aware or have any responsibility for make ready when the power company itself wants to add circuits or equipment like transformers or street lights to a particular pole as far as evaluating that pole for make ready?

MR. BUTLER: Do you mean does he have like

hands-on responsibility where he would be aware of the particular calculations?

MR. SEIVER: That's correct.

A We have engineering guidelines that our engineers follow when they're designing a work order. And if they are doing any kind of work on a pole, they are to follow our engineering design practices and construction standards.

BY MR. SEIVER:

Q And is it possible to tell from your records for example if a cable operator has been on a pole, and who was the last one to modify an attachment, if it was either electric or the cable operator during the -- I'm thinking about during the process of your pole inspection program.

A Again, during our pole inspection process we are not -- you know, we are looking for folks who are attached that are not permitted to be on the pole --

Q You're not looking for NESC compliance?

A Yes. We look for, you know, the loading, right, the compliance of the pole. But we're not -- at that point if the pole is overloaded, right, we are changing those poles out.

Q Are you going to charge the attachers for

Hearing Exhibit - 000701

that change out?

A We have not charged the attachers for those pole change outs. Now, what we do expect from the attacher is to do the transfer to the new pole.

Q I see. At their own expense --

A At their own expense, yes.

Q -- for the transfer. And those transfer costs have been something we've discussed before both for pole hardening as well, isn't that right?

A That's correct.

Q And I think in your testimony you may have made a comment that you did not have that information. But FCTA has given you some information on pole transfer costs, have they not?

A They've given us I understand some cost pers, right.

Q Right, in a range. I also believe it was in a range, wasn't it?

A Right.

MR. SEIVER: Mr. Miranda, if you'll just give me indulgence for a moment, please, Mr. Butler, thank you.

MR. BUTLER: Certainly.

MR. SEIVER: Thank you. Mr. Miranda and Mr. Butler, I have just a few more questions

Hearing Exhibit - 000702

and I'll be wrapped up.

BY MR. SEIVER:

Q Mr. Miranda, when I just asked you or a few minutes ago about the estimate of the pole rental increase that it would not include the cost of the 10-point initiative or the eight-year pole inspection program, I understand that you're not charging the change out for the poles discovered in the inspection program, but would the cost of the inspection be separately billed to attachers or is that going to be rolled into the general expenses that get put into the rent calculation, if you know?

A I don't know about the rent calculation. But the pole inspection program and the change out of the pole would not be an immediate direct charge. Now, there might be some impact based on the different class poles, but I would have to look at how the pole inspection program translates into the rental portion of it.

Q Right. It probably would be good enough for my answer now if you would say whether you would be separately charging the attachers for the cost of that inspection by an invoice or whether that would be accumulated with the other expenses?

A John, I'm sorry. I'm not following what

Hearing Exhibit - 000703

you're saying, other expenses.

Q I mean, if you're not charging an attacher for an expense that you incur, it gets booked to an account. The rentals look at the -- under the FCC formula -- a number of FERC accounts for administrative expense and asset accounts. I'm just trying to make a determination whether there would be a bill separately from you for an inspection, or if that expense of the inspection is just going to be booked in the normal course.

A I believe that is, John, but I'm not really expert enough to answer that question I don't think.

Q Okay. I appreciate that. On page 18 of your rebuttal at the bottom, line 19, you're discussing -- or responding to a question about Mr. Harrelson's suggestion about limited trial or pilot project bases. And you don't agree, am I right, with Mr. Mr. Harrelson's suggestion?

A That's correct.

Q But is there something less do you think than you're entire service area that you would agree is a sensible way to deploy extreme wind load to your distribution facilities?

A Yes. I think a couple of things, John, that I think maybe it's -- maybe not coming out in

Hearing Exhibit - 000704

my testimony, and my rebuttal, and all these components. We're taking a gradual approach, ramping our hardening initiatives, we're looking at extreme wind, at critical infrastructure, those that really serve a community needs. You know, on the incremental hardening, which is something a little bit less as you put it than extreme wind, and that is where we're going after, you know, key components within our infrastructure.

And that's really a -- we think that's a big part of our plan not only in the community but going forward, and incremental hardening we believe has a lot of merit on the surface and that's why we have said for now we're going to concentrate extreme wind on the critical infrastructure, but we also said extreme wind on new construction. And the reason for that is, as you know, the cost to redo work once you've built something is a lot -- you know, a lot more cost effective to build something to the new standard as part of the new construction and not have to come back at later date and rework it.

A simple example would be just going to the bigger class pole, you know, by going to a class 2 wood pole versus a Class 3 or 4, you know, the

Hearing Exhibit - 000705

incremental cost of a hundred or $200 is very small while you're building something under new construction. So that's why we said the new construction let's go ahead and begin all new activity under extreme wind. But the incremental hardening as you described -- you know, as you described something a little bit less -- that is kind of trying to maximize that benefit versus the cost that we're investing in our hardening.

Q Thank you. The exhibit that we had been looking at before, which was the FPL Bate stamped 240, if you could get that back in front of you and look at FPL 241, please, Mr. Miranda.

A Okay. Go ahead.

Q On that second page FPL 241 and about the middle there's a heading that says poles that fail wind load. Looking down at the first entry under that, number 1, it says where a, and I think it's underlined, guyed lateral pulls off another line, the pole is, in effect, storm guyed and one class lighter pole may be used.

Do you believe that guying effect of laterals or guying the pole itself for storm guying could be used to meet the overlash requirements?

A Yes. John, I think again this goes back to

Hearing Exhibit - 000706

the whole issue that Mickey brought before us, right, where, you know, he says that the effect --

MR. BUTLER: I'm sorry, Manny. John, can you repeat your question? Because I think -- I thought it was going some place different than it ended up. You ended up with talking about overlash requirements and I thought you were going to be talking about, you know, meeting our hardening objectives. So could you just re --

MR. SEIVER: I did intend it. I'm sorry. I changed it. You're right. If the witness is able to answer it, I would have wanted to reask it for the hardening objective as well as the overlash requirement.

MR. BUTLER: Could you just restate the question, please?

BY MR. SEIVER:

Q Mr. Miranda, I'll break the down into two parts. Would it be fair to say then that Florida Power & Light would consider a situation where a guyed lateral pulls off another line that the storm guying effect may in fact satisfy the extreme wind load construction standards for poles in your distribution system?

Hearing Exhibit - 000707

A Again, you know, the way we have stated this is that we believe there is some merit to having the effect of the lateral pulloffs from another line and the guying effect. And what we need to do is make sure we have the right technical calculations in evaluating that in our wind profile.

It's consistent with everything we said is back here, you know, when they wrote this attachment criteria. It's a may. You know, we need to go beyond the may, and now we're down to some specific engineering calculations. And once we can come up with a quantifiable way of calculating that then we will incorporate that as part of our analysis and as part of this pole attachments or make ready type work.

Q Thank you, Mr. Miranda. And then I presume your answer would be the same then if I asked you about that using the lateral pulloffs and guying effect for purposes of overlash loading compliance.

A That's correct.

MR. SEIVER: Thank you very much for your time. I appreciate it. And that concludes my questioning.

MR. O'ROARK: Mr. Miranda, before I get

Hearing Exhibit - 000708

started, do you need a break?

THE WITNESS: Yes, I would like one if you don't mind.

MR. O'ROARK: That will be perfectly fine. Shall we come back in five minutes.

(Brief recess.)

CROSS EXAMINATION

BY MR. O'ROARK:

Q Mr. Miranda, let's start by walking through the information that FPL has provided on the three prongs of its storm hardening plan. And let's start with extreme wind loading for critical infrastructure. I believe you've acknowledged that FPL has provided less detailed information for its 2008 and 2009 critical infrastructure projects than it has for its 2007 projects, is that correct?

A That's correct. We provided the one line, the aerial view, the Google map that shows the footprint of the facility, and what those critical infrastructure facilities will be.

Q And that's for 2008 and 2009?

A That's correct.

Q FPL is not providing cost estimates for its critical infrastructure projects for 2008 and 2009, is that right?

Hearing Exhibit - 000709

A We provided the range of which we think these cost estimates would be at the -- at the business -- at the hardening plan level.

Q When you say at the hardening plan level that would include all three prongs of your plan?

A Yes. The 75 to $125 million estimate, yes.

Q You have not provided an estimate specifically for the 2008 and 2009 critical infrastructure projects?

A The breakdown between the three components of critical, incremental, and new construction we have not provided that.

Q Does the information FPL has provided for the 2008 and 2009 critical infrastructure projects state what storm hardening technique will be used for each project?

A We have -- you know, for the critical infrastructure we have said that we would build those to extreme wind.

Q Have you identified how extreme wind loading would be achieved for each project?

A Are you referring to the specific engineering approach?

Q Yes.

A No, we have not provided that at this

Hearing Exhibit - 000710

point. What we have also -- as you know, the "Process within the Process" is to have predesign meetings and preconstruction meetings to make sure that we're incorporating or at least understanding the impact of the third party who are on these poles. And in your case, you know, since you also have some pole ownership.

Q Have you identified for 2008 and 2009 which poles will be affected from the critical infrastructure projects?

A The specific poles?

Q Yes.

A Not for 2008 and 2009.

Q If I understand FPL's discovery responses correctly, it intends to complete its critical infrastructure storm hardening for its entire footprint in six to eight years, is that correct?

A For the critical infrastructure that is our intent.

Q Does FPL also plan to apply EWL to the rest of its infrastructure over some period?

A What we currently have today as we -- the other parallel effort that is going on as you know the community projects. These are, if you would, *per se*, thoroughfares that have grocery stores, gas

Hearing Exhibit - 000711

stations and in that approach we are applying incremental hardening to those infrastructure.

Beyond that period, you know, we have looked at incremental hardening as approach for rest of the facilities. But, again, six to eight years from now I think, given work methods, processes and all that, you know, we don't know -- there might be an opportunity to build it all to extreme wind but right now we currently have many of that at incremental hardening.

Q Would it be fair to say then that FPL has not yet decided that it will upgrade its entire network eventually to EWL? Has it decided one way or the other?

A Yeah. I don't think we have made the decision completely at this point in light of all the, you know, work methods and products that will be evaluated. We have made the decision for critical infrastructure and all new construction will be built to extreme wind. So we're definitely -- we are definitely positioning ourselves to build everything to extreme wind in the future.

Q Thank you. Moving on to community hardening projects, has FPL identified any community

Hearing Exhibit - 000712

hardening projects for 2008 and 2009?

A No, we have not finalized that list.

Q Then moving to the third prong, design guidelines. Has FPL identified any projects to which the design guidelines will be applied that are not critical infrastructure or community hardening projects?

A Say that one more time.

Q Has FPL identified any projects to which the design guidelines will be applied that are not critical infrastructure or community hardening projects?

A It will be applied to all new construction.

Q My question is a bit more specific than that. Have you identified any particular construction projects to which the design guideline will be applied excepting the critical infrastructure and community projects?

MR. BUTLER: Are you asking if we know where the new construction is going to be, basically?

MR. O'ROARK: Yeah. Although even a little broader than that. I mean, we covered first two prongs and now I'm focusing in on projects under the third prong.

Hearing Exhibit - 000713

MR. BUTLER: With the third prong being for new construction and major rework, I was just trying to understand, is that what you're getting at?

MR. O'ROARK: Yes, it is. And the question is: has FPL identified any projects under that third category.

A All our projects are being built under that knew criteria so anything that we are out there working on, on a daily basis.

BY MR. O'ROARK:

Q Understood. Are you getting any kind of notification to attachers as you go about that daily work?

A Well, it would be the normal course of business. So if we are out there building any infrastructure whether new construction or not, then we would provide you notification through our normal process of, you know, sending you the job prints or engin. saying we are now doing new construction in the area.

Q Are those projects that you would consider to be included within the "Process within the Process"?

A No.

Q Let me direct you, Mr. Miranda, to your direct testimony at pages 16 and 17.

A Can we go back? You know, I was just kind of making sure that I'm clear on FPL's position going forward on extreme wind. And I just want to make sure --

Q Certainly.

A You know, the way we are approaching our infrastructure hardening is to do incremental hardening to position us for extreme wind and our goal is to build everything to extreme wind ultimately. I just want to make sure that we're clear that is kind of our ultimate objective of building to extreme wind.

Q Thank you for that clarification. That had not been clear to me. I thought you had said before that you had not decided whether you were going to upgrade the entire network up to EWL.

A We are building our incremental hardening to position it, you know, so that one day we can, you know, ultimately upgrade all our facilities, you know, and build everything ultimately to extreme wind.

Q Do you have a timetable for that?

A No, I do not at this point.

Hearing Exhibit - 000715

Q Thank you for that clarification. Are you now at your direct at pages 16 and 17?

A Yes.

Q I want to walk through briefly with you the reasons underlying FPL's EWL strategy. The first reason you identify is FPL's experience during the 2004 and 2005 storm seasons, is that right?

A Yes.

Q Is Mr. McEvoy the person at FPL who has the most knowledge about FPL's analysis of these storms?

A The forensic analysis?

Q Yes.

A Yes.

Q Is there some other analysis other than forensic analysis that has been done on those storms?

A You mean on the '04 and '05 seasons?

Q Correct.

A Just the KEMA report and forensic analysis that was conducted. And the Davies Consulting that you saw.

Q Anybody else?

A No.

Q The second reason you identify is the KEMA evaluation of Hurricane Wilma. Again, would I be

correct to assume that Mr. McEvoy would be the person at FPL who has the most knowledge about the KEMA study?

A From the analysis that was performed, the forensics and the root causes of the outages, he would be the most knowledgeable.

Q Is there some other aspect of the KEMA study that somebody else at FPL would be more knowledgeable about?

A Well, there are components in the KEMA study that relate to substations and transmission that are outside of John McEvoy's expertise, if you will.

Q Thank you for that clarification. If we hone on in distribution poles, would Mr. McEvoy be the most knowledgeable at FPL?

A Yes.

Q The next reason you give is that the greater success of transmission poles during Hurricane Wilma, is that right?

A Where are you at?

Q In your direct on page 17, starting at line 5.

A Yes. Okay.

Q The question was just whether the greater

Hearing Exhibit - 000717

success of transmission poles during Hurricane Wilma was one of the reasons that you list?

A Yeah.

Q It's true that transmission pools usually are taller than distribution poles?

A Generally, yes.

Q And their conductors therefore also are higher.

A Conductors are higher.

Q Transmission poles are less prone to failure because of falling trees and limbs and windblown debris because of their height, isn't that true?

A I wouldn't categorize the wind only because of their height. I would say when you look at our Wilma analysis, you know, we separated tree-related outages and we separated presence of deterioration. Wind only -- transmission would be subject to the same wind-only failure profiles of distribution facility if those other components weren't in effect.

Q Let me make sure I've gotten an answer to my question. Is it true that transmission poles are less prone to failure because of falling trees and limbs and wind-borne debris because of their height?

Hearing Exhibit - 000718

A I don't know about wind-borne debris, but I would say probably trees there would be some extent to that. But it also depends on how you trim the facilities and where these facilities are located. There are circumstances where transmission lines are exposed to trees as well.

Q I'm trying to understand your answer. So is it your testimony that transmission poles are just as subject to failure because of windblown debris as distribution poles?

A I don't know the answer to that, whether debris -- whether transmission or distribution, what their relative profiles are.

Q Do you know as to falling trees?

A I would say -- as it relates to trees I would say they're minimal but it's not a zero base.

Q What do you mean they're minimal?

A I mean less than distribution but I wouldn't say there wouldn't be any.

Q They're less prone to failure than distribution poles on account of falling trees, is that what you're saying?

A Sorry. Say that one more time.

Q Are you saying that transmission poles are less prone to failure than distribution poles on

Hearing Exhibit - 000719

account of falling trees?

MR. BUTLER: D., are you as you were before adding to that because of their height?

MR. O'ROARK: Yes. Short circuiting it a bit but I'll be happy to reask the question.

BY MR. O'ROARK:

Q Would you agree that transmission poles are less prone to failure on account of falling trees because of the height of the transmission poles?

A Again, I don't know the answer to that directly because if a tree falls on the pole itself, D., I don't know -- now, are you saying if it falls on a conductor -- you know, the conductor is above the tree line is that what you're implying?

Q Well, I'm really asking the question generally but I suppose trees can fall directly on poles and they can also fall on conductors at least if the pole is low enough.

A Is that what you're referring to -- is that what your question is, is because the conductors are higher and the trees won't fall on the conductor?

Q That would be one reason that transmission poles would be less prone to failure than distribution poles, right?

A Right.

Hearing Exhibit - 000720

Q That's true with respect to falling trees and limbs, correct?

A If they are above the tree line, yes.

Q The fourth reason you list is the Davies Consulting study. And I gather that compares the performance of 10 utilities during six storms, is that right?

A Yes, six hurricanes and 10 utilities.

Q Were all 10 utilities exposed to all six storms?

A No. That's -- what the chart shows is the respective performance of that -- on those utilities as related to that respective hurricane.

Q Does that mean that there was only one other utility that was exposed to -- one other utility other than FPL that was exposed to each storm?

Why don't we take Katrina. Strike the previous question. Other than FPL how many other utilities were exposed to the storm according to this?

A I don't have that -- I don't have that information here as to which storm was exposed -- which utility was exposed to which storm.

Q Can you tell me how many utilities were

exposed to each storm?

A Well, we have 10 utilities that were exposed to hurricanes.

Q Right. But say looking at this chart, can you tell how many utility were exposed to Hurricane Katrina?

A No. What the chart is showing is the correlation of those utilities that were exposed to hurricanes, with the different categories of hurricanes, and how -- and their current grade of construction and how that relationship was with reference to our construction of Grade B.

Q Was the average age of the pole inventory for each company the same?

A Again, the purpose of this analysis was to look at the differences in grade of construction.

Q Do you know whether the average age of the pole inventory for each company was the same?

A No, I do not know.

Q Do you know whether the storms effected approximately the same number of poles for each utility?

A That's what the chart is looking at, is to look at the pole failure rate on a percentage basis versus the exposure of the hurricane category that

Hearing Exhibit - 000722

it faced.

Q I understand that it describes it in percentage terms. But do you know the actual number of poles with exposure to the storms?

A I do not have that but I assume when they got the information that's how they arrived at the percentage of pole failures.

Q Just to take an extreme example it might be that FPL had 10,000 poles exposed, and some other utility had a hundred poles exposed.

A Okay.

Q I guess I'm asking theoretically that's a possibility. I know you've already said you don't know for sure.

A Yes, that could be a possibility. Again, the intent was to look at failure rates versus the total exposure.

Q Do you know whether the other utilities had identical construction standards to FPL's except for the Grade C distinction?

A No. Just the Grade C distinction.

Q Did any of the storms affect areas where FPL had Grade C poles?

A Did any of our storms -- you mean, during the -- in our chart?

Hearing Exhibit - 000723

Q Did any of the six storms reflected in the chart affect areas where FPL had Grade C poles?

A There is a possibility that we had a period during FPL's history where Grade C construction was in place and so there is a possibility that we have some Grade C poles in some of these territories.

Q And Grade C poles were installed in some areas for FPL from 1993 to 2004, is that right?

A That's correct.

Q In what areas were Grade C poles installed?

A I can give you maybe the reverse, it might be easier. I would have to --

Q Okay.

A I would have to look at the document but from what I recall was Dade and Broward were built to Grade B, and then Palm Beach and -- I forget the other county were built -- the coastal areas were built to Grade B, and there was one county on the west coast, I think it was Collier that was also built to Grade B during this period.

Q So there were approximately five counties where the Grade B construction was maintained?

A I would have to verify that but it's about that.

Q And then all other counties for FPL were

Hearing Exhibit - 000724

Grade C during that time?

A During that period Grade C construction was the standard but I would caveat that with that given the nature of the type of construction we have in our territory that, you know, much of that may have been built to -- you know, because of our property lines and the density of our service territory we suspect it was built to a higher standard. But it was -- Grade C was the standard at the time.

Q Do you know what percentage of FPL's poles are Grade C?

A No, I do not know that.

Q Mr. Miranda, have any other utilities in the United States to your knowledge moved to EWL design guideline?

A Not to my knowledge.

Q Is the decision to move to EWL based on the assumption that storms have different effects in Florida than elsewhere in the United States?

A The decision to move to EWL was based on our experiences that we've had from these hurricanes, and the wind profile that we have in our service territory, and the effects that we had again from the '04 and '05 hurricane seasons.

Q You mentioned wind profiles before. Is it

Hearing Exhibit - 000725

possible that you could have two different storms that took the same path and had the same wind speed but had different profiles?

A You mean as far as their footprint, how big they are, their density and so forth?

Q Well, let me ask it another way: what do you mean by storm profile?

A Well, what I'm saying is some storms are stronger than others, where the storm comes into our territory, and also how big the storm is, right, the footprint of that storm.

Q And so if -- is it your understanding that any storm that had the wind speed of Wilma, the direction of Wilma, and the size of Wilma would produce the same wind-only affects as Wilma?

MR. BUTLER: What were the factors that you listed that are the same?

MR. O'ROARK: I attempted to replicate the ones that Mr. Miranda provided: the wind speed, the path, and the size of the storm. If those three things are held constant, is it Mr. Miranda's understanding that the wind-only effects would be the same.

A If it's an identical storm that comes to the identical area, then it would be the same.

Hearing Exhibit - 000726

BY MR. O'ROARK:

Q I didn't ask you if the storm was identical. I asked you if those three features were held constant, it was your understanding that the wind-only effects would be the same. Or are there idiosyncrasies between storms to your knowledge?

A Well, you know, I think every storm always has some idiosyncrasies. But the wind-only piece is not just limited to Wilma. Any storm that has a wind profile -- a wind that exceeds our design criteria exposes us to the wind-only component that is the root cause that we've identified.

Q Would you agree that the NESC committee's conclusion that EWL should not be applied to distribution infrastructure is based on the understanding that most total failures during storms arise from falling trees and limbs and windblown debris?

MR. BUTLER: Object to the form of the question.

Q Mr. Miranda, you can answer subject to the objection.

A Yeah. I understand the NESC committee's reasons for their comments about the debris and tree as we had a very similar position prior to Hurricane

Hearing Exhibit - 000727

Wilma. But Wilma clearly -- based on the detailed forensics that we got for that storm which are really, you know, probably one of the few in the country that has that level of detail, that's where we identified the wind only as being a major root cause.

Q Does FPL believe its forensic analysis has proved that the NESC's understanding as to the cause of pole failures is wrong?

A I believe that our forensics have indicated that there are other factors besides tree and debris contributing to pole failures during a hurricane.

Q I believe you said that you understood the NESC committee's conclusion that EWL should not be applied to distribution infrastructure based on its understanding that most pole failures during storms arise from falling trees, and limbs, windblown debris. Is it FPL's understanding that the NESC committee's conclusion is incorrect and that in fact for hurricanes wind-only damage is the predominant cause?

MR. BUTLER: I'd object. That's asked and answered.

Q Subject to the objection, please answer if you can, Mr. Miranda?

A Yeah. I think what I have stated is that prior to Hurricane Wilma and us having the detailed forensics, you know, we did not have wind only as being a major root cause, and Wilma forensics clearly indicate that the other components that you just mentioned, the debris and trees, are also contributors to pole failures. But wind only was the predominant root cause from the Wilma forensics that we conducted which is what changed our position and why we have proposed the extreme wind design.

Q And on that basis you think the NESC is wrong, don't you?

A Again, I wouldn't judge NESC. All I can state is what FPL's view of what occurred during the storms and our ability to change. And I don't think the NESC is right or wrong, just maybe they don't have all the data that we have.

Q In other words, Mr. Miranda, does FPL believe its conclusion about wind-only damage as being -- or wind only being the predominant cause, is that a universal principle that applies to hurricanes or is it just something you think that is idiosyncratic to Florida?

A Well, again, all I can speak for is what happened at FPL service territory and our analysis

Hearing Exhibit - 000729

and our data that we found as part of our forensics. I have not done forensics for other states.

Q On how many storms has FPL done forensic analysis?

A It's conducted it on the two storms, Katrina and Wilma, and John McEvoy can provide you those details.

Q Let me ask you to turn to page 18 of your direct, please. And let me know when you're there.

A Okay.

Q And I apologize, line 18 -- sorry. Page 18, line 13.

A Okay.

Q This is the testimony about benefits that you've been asked about before today. I want to make sure I understand this sentence, Mr. Miranda. Let's just -- let's take a hypothetical and see if we can get our arms around it. Let's assume that the net present value of the amounts expended on extreme wind loading are a hundred million dollars over the 30-year period. Are you with me so far?

A It would be extreme wind and incremental hardening, both. Right.

Q The price tag discounted to present value

let's say is a hundred million dollars. If storms end up coming every five years, does that mean that we would expect to see $45 million present value in restoration benefits?

A Coming over the -- over -- yes, over that 30-year period.

Q And likewise if it turns out storms come every three years does that mean that we would see $70 million in restoration benefits?

A Right.

Q And I believe that in discovery responses FPL said that historically storms come every five years?

A On average.

Q And in that context what do you mean by storm? Do you mean hurricane?

A Hurricane, yes.

Q And I assume that's the same thing that you mean here in your testimony on page 18, starting at line 13 when you talk about storm frequency of once ever three to five years are you talking about hurricanes?

A Yes.

Q And does that mean that a hurricane touches your service territory once every three or once

Hearing Exhibit - 000731

every five years or something else?

A It can be a combination of factors. What we're mostly talking about is, you know, what we consider an average storm during this period. But you can have hurricanes that have a direct impact to landfall and you have some that are indirect, depending how close they get to our service territory and can expose us to hurricane-force winds.

Q When you say restoration benefits what do you mean?

A The amount of damage that would be reduced as a result of our hardening initiatives.

Q Reduction in pole failure, for example.

A Correct.

Q Did FPL take into account increased cost of replacing larger poles that fail during this storm when doing this analysis?

A We looked at what we considered would be the offsetting wind-only gains associated with hardening. You know, as far as the restoration effort, what we -- I mean the analysis -- what we looked at was the savings associated by not having these outages from wind only root cause.

Q So does that mean that you did not take

Hearing Exhibit - 000732

into account any increased expenses that would come from replacing larger poles that nonetheless failed?

A You mean failed because of wind only?

Q Failed for any reason. Failed because a tree fell on it.

A Right. If we had a replacement of a pole, the incremental cost associated with having larger construction, no, we did not consider that. But we clearly expect a significant reduction in the number of -- amount of damage that we would have following a storm because it's hardened.

Q Just let me pause one moment, please. Mr. Miranda, I apologize for the interruption. Did FPL factor in any increased difficulty in obtaining larger replacement poles in its analysis?

A What do you mean by difficult?

Q Is it your experience that it may be more difficult during restoration efforts to obtain larger poles than smaller ones?

A Well, as part of our preparations for hurricane season, we would ramp up or inventory of larger poles. In addition since we have gone to the larger sized poles, we have a larger inventory of our Class 2, 3, and 4 wood poles. So we would expect that we would have availability of those

Hearing Exhibit - 000733

poles much more now that we are moving to the new guideline.

Q Let's go back to the hypothetical where the present value of the expenditures is a hundred million dollars and it turns out the storms come every five years. And you recall, I believe, that you said that you would expect to see $45 million in restoration benefits. Do you recall that testimony?

A Yes.

Q To break even in that scenario FPL would have to realize $55 million in benefits from the reduction in outages, is that right?

A Say that last part one more time.

Q Sure. To break even in that scenario FPL would have to realize -- or someone would have to realize $55 in benefits from the reduction in customer outages, is that correct?

A Right. For FPL's direct cost, correct.

Q Does FPL have any way to measure those benefits?

A The value to our customers for the expended outages --

Q Yes.

A -- in the community? No, we have not measured those benefits.

Hearing Exhibit - 000734

Q Mr. Miranda, let me ask you to turn to the FPL responses to the FCTA's interrogatories, specifically interrogatory number 4.

A Hold on.

MR. BUTLER: It will take a moment to get that. Hold on.

MR. O'ROARK: Sure.

THE WITNESS: Okay.

BY MR. O'ROARK:

Q I'm looking at the second paragraph of the response where FPL -- I'm looking at interrogatory number 4, second paragraph of the response says, to the extent a pole is replaced solely due to storm hardening FPL will not require any cable operator to pay for replacement of an FPL pole. Cable operators are responsible for their transfer costs. I want to ask whether the same was true for telephone company attachments?

A In the case where we are changing a pole out that is a FPL pole?

Q Yes.

A We are not charging the telephone company to pay for that direct cost associated with that.

Q I gather whatever additional costs there are kind of come out in the wash through increased

Hearing Exhibit - 000735

rents?

A I would think there would be an impact on the increased rents, but we would also expect the joint user to transfer at their expense.

Q Is the same true for new poles? That when FPL puts in a new pole that the only expense to a telephone company attacher is the cost of attaching its facilities to the pole?

A Are you referring to new construction?

Q Yeah. Just assume that FPL decides to install a new pole and a line.

A Right. Like an intermediate pole?

Q Yes.

A Yeah. We would install it at our expense and we would ask for you to do your transfer to that pole.

Q Let me ask you to turn to interrogatory number 1, please.

A FCTA?

Q Yes, sir.

A Okay.

Q Looking at the first sentence of the response to B, FPL is not seeking direct reimbursement from cable operators when storm hardening existing infrastructure. Is that true for

Hearing Exhibit - 000736

telephone companies as well?

A The only thing I'm thinking is we would be looking for the -- if one of those poles was yours, right, we would want you to change out that pole to harden it. But if it's -- if it's one of -- if it's all FPL poles, right, we would not have direct charges to you on us changing that pole out.

Q FPL's plan does not apply to other parties' telephone poles or utility poles, does it?

A Clarify that.

Q My understanding was that FPL storm hardening plan would only apply to FPL's utility poles and not to other parties' utility poles. Do you have a different understanding?

A Well, we are -- well, we are looking for parties that have joint poles, right, we would negotiate what -- how to handle those poles that are in the -- in project that is going to be hardened.

Q That would be something that would be subject to negotiation independent of FPL's storm hardening plan?

A Yes.

Q Going back to the original question -- I probably got an answer but let me just check -- for that first sentence about FPL not seeking direct

Hearing Exhibit - 000737

reimbursement from cable operators when storm hardening existing infrastructure. That would apply equally to telephone company attachments, is that right?

A I think that is right, yes.

Q And then the response goes on that for new infrastructure FPL will seek only the incremental difference in cost to accommodate the cable operators' attachments. Is that also true for telephone company attachments?

A Yeah. I mean incremental requirements associated with telephone and/or cable. Again, I think part of that, the joint-use contract. So your particular case I would have to understand our joint-use agreement if it's a negotiated item.

Q So everything else we had talked about -- I guess that's kind of what I was getting at. Well, let me just make sure. That doesn't change your previous responses, does it?

MR. BUTLER: Does what change his previous responses?

MR. O'ROARK: Yeah. Let me try again.

BY MR. O'ROARK:

Q You're saying with respect to this particular sentence with respect to incremental

difference in cost that is something that might depend on joint-use agreements?

A Yeah. I think the issue will be in the case where you have poles in our pole line and how we would handle those particular circumstances. If it's our pole, it's the same; but if it's your pole, I think that is where we would have to look at how the terms of the contract are.

Q Now, I understand.

MR. O'ROARK: Mr. Miranda, that's all I have. Thank you very much.

MR. YOUNG: Mr. Butler, do you have any questions?

MR. BUTLER: Just to be sure, there is no anyone else who has questions for Mr. Miranda, is that right? I'm not going to have much but give me a moment or two to just review my notes and see if there's anything that I need to ask him in follow up.

MR. YOUNG: Not a problem.

(Discussion off the record.)

MR. BUTLER: This is John Butler. I'm back. And we do not have any follow up questions.

(Deposition concluded at 3:00 p.m.)

Hearing Exhibit - 000739

CERTIFICATE OF REPORTER

STATE OF FLORIDA:

COUNTY OF LEON:

I, CAROLYN L. RANKINE, do hereby certify that the foregoing proceedings were taken before me at the time and place therein designated; that my shorthand notes were thereafter translated under my supervision; and the foregoing pages number 1 through 167 are a true and correct record of the aforesaid proceedings.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor relative or employee of such attorney or counsel, or financially interested in the foregoing action.

DATED THIS 23rd day of September, 2007.

CAROLYN L. RANKINE
2894-A Remington Green Lane
Tallahassee, Florida 32308
850.878.2221

Hearing Exhibit - 000740

STATE OF Florida

COUNTY OF Palm Beach

CERTIFICATE OF OATH

I, the unde: signed authority, certify that MB "Manny" Miranda personally appeare d before me at 700 Universe Blvd Juno Beach, FL 33408 and was duly sworn by me to tell the truth.

WITNESS my hand and official seal in the City of Juno Beach County of Palm Beach, State of Florida, this 19th day of September, 2007.

Notary Public State of Florida
Jennifer M Payne
My Commission DD439096
Expires 6/09/2009

Jennifer M Payne Hebburn
Notary Public
State of Florida

My Commission Expires: 6/9/09

Personally known X or who has produced _____.
Type of identifica ion produced _____

ASR ACCURATE STENOTYPE REPORTERS INCORPORATED
CERTIFIED COURT REPORTERS

September 23, 2007

JOHN T. BUTLER, ESQUIRE
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, Florida 33408-0420

Re: Infrastructure of TECO, Progress, Gulf, and FPL
Docket Nos. 070297-EI, 070298-EI, 070299-EI, 070301-EI

Dear Mr. Butler:

Enclosed please find your copy of the deposition of Manuel B. Miranda taken on September 19, 2007, in the above-styled cause.

As the witness did not waive reading and signing, I am also enclosing an errata sheet as the last page of the transcript and request that your office make the necessary arrangements with the witness to read your copy of the deposition, noting any corrections on the errata sheet.

Please forward the completed original signed and dated errata sheet to Katherine E. Fleming, Esquire, and copies to John D. Seiver and Dulaney L. O'Roark, III, Esquires. If the errata sheet or a request for an extension is not received within 30 days, counsel may assume that the signature has been waived.

Thank you for your assistance in this matter. It was a pleasure working with you.

Sincerely yours,

CAROLYN L. RANKINE, RPR, CP

CLR/mam

Enc. (Errata sheet and transcript)

cc: Katherine E. Fleming, Esquire
John D. Seiver, Esquire
Dulaney L. O'Roark, III, Esquire

Hearing Exhibit - 000742

ERRATA SHEET

Under penalties of perjury, I declare that I have read the transcript of my deposition, pages 1 through 167, and hereby subscribe that the facts stated in it are true, including any corrections and/or amendements listed below.

9/26/07
DATE

MANUEL B. MIRANDA (WITNESS)

9/26/07
DATE

NOTARY PUBLIC

In re: Review 2007 Infrastructure Storm Hardening

Page	Line	Correction or amendment	Reason for change
7	5	"per" s/b "matrix"	
7	9 & 10	"net tel" s/b "and FPL's"	
8	17	"what" s/b "was"	
18	7	"in fact" s/b "exact"	
23	14	"ELC" s/b "EOC"	
28	18	"funding" s/b "flooding"	
29	5 & 6	"a voided" s/b "avoided"	
46	9	"dollar" s/b "thousand"	
46	24	"Be" s/b "The"	
60	22	"Vickie Allison" s/b "Mickey Harrelson"	
67	3	"is" s/b "its"	
67	4	"that's" s/b "let's"	
68	10	delete "a"	
69	18	"meeting" s/b "having"	
71	8	"full" s/b "pole"	
72	16	"hurricane" s/b "hurricanes"	
72	17	"strength" s/b "have"	
73	11	"John, our" s/b "John, in our"	
73	12	"or" s/b "our"	
74	24	"giving" s/b "given"	
76	4	"level" s/b "levels"	
76	8	"that the" s/b "that with the"	
76	9	"interrupt on" s/b "interruptions or"	
77	25	"your" s/b "you're"	
82	19	"performs" s/b "performs better"	
82	21	"seen a" s/b "seen instead of a"	
86	4	"direction the" s/b "direction of the"	
86	16	"guy" s/b "guys"	
86	18	delete 2nd "to"	
86	19	"and not" s/b "and do not"	
103	1	"concentrating" s/b "concentrating on"	
111	12	"post" s/b "most"	

Date of deposition: September 19, 2007 Reporter: CAROLYN L. RANKINE

ERRATA SHEET

Under penalties of perjury, I declare that I have read the transcript of my deposition, pages 1 through 167, and hereby subscribe that the facts stated in it are true, including any corrections and/or amendements listed below.

9/26/07
DATE

MANUEL B. MIRANDA (WITNESS)

9/26/07
DATE

NOTARY PUBLIC

In re: Review 2007 Infrastructure Storm Hardening

Page	Line	Correction or amendment	Reason for change
117	20	poll s/b pole	
118	6	John, who s/b John, or who	
124	12	light s/b line	
132	17	bases s/b basis	
142	9	knew s/b new	
161	21	or s/b our	
140	4	as approach s/b as the approach	
140	4	for rest s/b for the rest	

Date of deposition: September 19, 2007 Reporter: CAROLYN L. RANKINE

Feeder Hardening Macro Economic Evaluation

	I. Avoided Storm Restoration Costs	Total	2004			2005			
			Charley	Frances	Jeanne	Dennis	Katrina	Rita	Wilma
1	Total Distribution Cost (000s)	1,448,308	207,457	237,402	246,256	9,024	135,427	10,487	602,255
2	Overhead Distribution Cost (000s)	1,303,477	186,711	213,662	221,630	8,122	121,884	9,438	542,030
3	Overhead Distribution Feeder Costs (000s)	391,043	56,013	64,099	66,489	2,436	36,565	2,831	162,609
4	Affected Feeder Backbone Miles	22,983	2,248	6,654	4,337	751	2,565	155	6,273
5	Feeder Restoration Cost / Mile	17,014	24,917	9,633	15,331	3,244	14,255	18,268	25,922
6	Estimated Restoration Savings from Hardening / Mile	12,250	17,940	6,936	11,038	2,336	10,264	13,153	18,664

	II. Avoided Storm Restoration Costs 30-Year NPV	Total
7	Base Case - Average 1 Storm Every 3 Years (per mile)	56,330
8	Sensitivity - 100-Year Average (1 Every 5 Years) (per mile)	36,168

	III. Hardening Cost / Mile NPV	78,222
9		

	IV. NPV as % of Hardening Cost / Mile	Total
10	Base Case - Average 1 Storm Every 3 Years	72%
11	Sensitivity - 100-Year Average (1 Every 5 Years)	46%

Hearing Exhibit – 744-A

Notes:

1. This economic evaluation was conducted on FPL's Distribution feeder backbone system only, as this is the predominant focus of FPL's Storm Hardening Plan
2. The benefits are calculated over a 30 year period in order to account for the fact that hurricanes are not necessarily expected to impact FPL's service territory every year and therefore the benefits need to be analyzed over an extended period to reflect the expected average hurricane frequency
3. The cost and benefits are based on the best current engineering and forensic data available. FPL will continue to re-evaluate the costs and benefits as new systems and technology enter the market, more implementation experience is gained and more and better storm forensic data and analyses become available

Feeder Hardening Costs & Avoided Storm Restoration NPV

	Feeder Hardening Costs				Feeder Miles*		
Year	CIF Feeders	Non-CIF Feeders	Total	Total Costs ($2007)	CIF Feeders	Non-CIF Feeders	Total
1	26,972,170	13,707,890	**40,680,061**	**40,680,061**	112	84	**196**
2	40,393,195	8,939,619	**49,332,816**	**45,094,575**	179	60	**239**
3	109,804,030	10,611,834	**120,415,867**	**100,614,484**	533	72	**606**
4	94,242,788	13,403,207	**107,645,999**	**82,217,275**	474	97	**571**
5	90,281,511	16,109,149	**106,390,665**	**74,277,470**	432	111	**543**
6	91,665,680	13,039,636	**104,705,322**	**66,820,655**	390	89	**479**
7	92,153,124	7,946,387	**100,099,518**	**58,393,210**	439	57	**496**
8		112,787,873	**112,787,881**	**60,142,462**		771	**771**
9		113,548,377	**113,548,386**	**55,346,240**		736	**736**
10		108,518,367	**108,518,377**	**48,350,263**		718	**718**
11		93,113,567	**93,113,578**	**37,922,500**		614	**614**
12		102,883,639	**102,883,651**	**38,301,758**		690	**690**
13		99,136,296	**99,136,309**	**33,735,992**		652	**652**
14		96,677,692	**96,677,706**	**30,072,911**		631	**631**
15		94,233,299	**94,233,314**	**26,794,274**		637	**637**
16		90,957,071	**90,957,087**	**23,640,816**		624	**624**
17		87,490,444	**87,490,461**	**20,786,196**		593	**593**
18		85,080,720	**85,080,738**	**18,477,106**		588	**588**
19		76,289,438	**76,289,457**	**15,144,524**		516	**516**
20		69,208,941	**69,208,961**	**12,558,617**		470	**470**
Total	545,512,498	1,313,683,446	1,859,195,944	889,371,388	2,560	8,810	11,370
Weighted Average Cost / Mile ($2007)				78,222			

* Feeder miles do not include miles after OCR; approximately 20% of miles after OCR will be harden

	Avoided Storm Restoration Costs			
	Base Case	Sensitivity		
Year	(Every 3 Years)	(Every 5 Years)	CPI	CPI Multiplier
1	12,250	12,250	2.24%	1.000
2	-	-	1.71%	1.017
3	-	-	1.98%	1.037
4	12,952	-	1.94%	1.057
5	-	-	2.00%	1.078
6	-	13,467	1.94%	1.099
7	13,720	-	1.88%	1.120
8	-	-	1.86%	1.141
9	-	-	1.91%	1.162
10	14,513	-	1.91%	1.185
11	-	14,798	1.96%	1.208
12	-	-	1.93%	1.231
13	15,373	-	1.91%	1.255
14	-	-	1.93%	1.279
15	-	-	1.92%	1.304
16	16,274	16,274	1.91%	1.328
17	-	-	1.93%	1.354
18	-	-	1.95%	1.380
19	17,246	-	1.98%	1.408
20	-	-	1.98%	1.436
21	-	17,934	1.97%	1.464
22	18,284	-	1.95%	1.493
23	-	-	1.96%	1.522
24	-	-	1.97%	1.552
25	19,377	-	1.94%	1.582
26	-	19,758	1.96%	1.613
27	-	-	1.94%	1.644
28	20,533	-	1.95%	1.676
29	-	-	1.97%	1.709
30	-	-	2.00%	1.743
NPV	56,330	36,168		

Discount Rate 9.40%

Hearing Exhibit – 744-C

Rule 25-6.0342 - Florida Power and Light Company Storm Hardening Plan

Item ltr	Activity	Docket No.	Actual/Estimated Utility Costs ($ millions) - (O)=O&M, (C)=Capital						Estimated Benefits to Utility Customers						Other Estimated Company Benefits			Estimated Benefits to Third Party Attachers					
									Impact on Storm Restoration Costs ($ millions)			Impact on Storm Caused Outages						Impact on Storm Restoration Costs			Impact on Storm Caused Outages		
			2004	2005	2006	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
(a)	**Wooden Pole Inspections.**	060078-EI see Note (a)	(O)$0.3 (C)$0.2	(O)$0.2 (C)$0.4	(O)$3.8 (C)$7.4	(O)$13.1 (C)$28.2	(O)$13-14 (C)$27-31	(O)$13-14 (C)$27-31	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
	Ten Storm Hardening Initiatives.	060198-EI																					
(b)	1 A Three-Year Vegetation Management Cycle for Distribution Circuits	see Note (b)	(O)$38.6	(O)$39.3	(O)$52.6	(O)$65.1	(O)$64.4	(O)$68.4	$0.6 (10yr annual avg.)	$0.6 (10yr annual avg.)	$0.6 (10yr annual avg.)	100,000 (10yr annual avg. CI)	100,000 (10yr annual avg. CI)	100,000 (10yr annual avg. CI)	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(c)	2 An Audit of Joint-Use Attachment Agreements		n/a	n/a	n/a	(O)$1.2-1.5 T&D	(O)$1.2-1.5 T&D	(O)$1.2-1.5 T&D	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(d)	3 A Six-Year Transmission Structure Inspection Program		(O)$1.7 (C)$8.9	(O)$2.0 (C)$8.9	(O)$2.8 (C)$10.4	(O)$2.6 (C)$10.6	(O)$2.5-3.5 (C)$9.5-10.5	(O)$2.5-3.5 (C)$9.5-10.5	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(e)	4 Hardening of Existing Transmission Structures		n/a	n/a	n/a	(O)$0.4 (C)$6.9	(O)$0.3- $0.5 (C)$5-7.5	(O)$0.3-0.5 (C)$5-7.5	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(f)	5 Transmission and Distribution GIS		n/a	n/a	(O) $0.03 (C) $0	(O) $0.03 (C) $2.2	(O) $0.10 (C) $2.3	(O) $0.11 (C) $1.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(g)	6 Post-Storm Data Collection and Forensic Analysis	see Note (g)	n/a	n/a	(O) $0.07	see Note (g)	see Note (g)	see Note (g)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(h)	7 Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems	see Note (h)	n/a	n/a	n/a	see Note (h)	see Note (h)	see Note (h)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(i)	8 Increased Utility Coordination with Local Governments		n/a	n/a	(O) $0.05	(O) $0.05	(O) $0.15	(O) $0.05	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(j)	9 Collaborative Research on Effects of Hurricane Winds and Storm Surge		n/a	n/a	n/a	(O) $0.05-0.10	(O) $0.05-0.10	(O) $0.05-0.10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(k)	10 A Natural Disaster Preparedness and Recovery Program	See Note (k)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Compliance with National Electric Safety Code's adoption of Extreme Wind Loading Standards.	070xxx-EI																					
(l)	1 New Distribution Facilities	see Notes (l)-(n)	n/a	n/a	n/a	(O)$0.5 - 1.0 (C)$5.0 - 7.0	$75-125	$100-150	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(m)	2 Major planned expansion, rebuild, or relocation of distribution facilities	see Notes (l)-(n)	n/a	n/a	n/a	(O)$1.0 - 1.5 (C)$13 - 15			n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(n)	3 Critical infrastructure and major thoroughfares	see Notes (l)-(n)	n/a	n/a	(O)$1.7 (C)$15.9	(O)$3 -$4 (C)$26 - 33			n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
	Mitigating flood and storm surge damage to underground and supporting overhead facilities.	070xxx-EI																					
(o)	1 Transmission		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
(p)	2 Distribution		n/a	n/a	n/a	(O) $0.05-0.1 (C) $0.45-0.9	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/q	n/a	n/a	n/a	n/a	n/a	n/a
(q)	**Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance.**	070xxx-EI	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	TOTALS	O&M	(O)$40.6	(O)$41.5	(O)$61.1	(O)$87.1-89.5																	
		Capital	(C)$9.1	(C)$9.3	(C)$17.8	(C)$91.9-102.9	$201-261	$229-289															

Item ltr NOTES:

(a) Costs associated with inspections performed as part of daily work are not captured separately and therefore are not included.

(b) Benefits from FPL's proposal (filed June 1, 2006) for the FPSC 10-Point Storm Secure Plan

(g) FPL's proposal (filed June 1, 2006) for the FPSC 10-Point Storm Secure Plan - $50k-$100k per storm.

(h) FPL's proposal (filed June 1, 2006) for the FPSC 10-Point Storm Secure Plan - $50k-$100k per storm.

(k) FPL's existing plan meets Commission proposal requirement. No additional cost expected.

(l) - (n) "Estimated Benefits to Utility Customers" and "Other Estimated Company Benefits" to be provided in FPL's responses to Staff's 1st Set of Interrogatories, Docket No. 070301-EI, where "n/q" is "Not yet quantified". Where "n/a", not available or applicable to FPL.

(n) 2007 costs are engineering estimates, not as-built. 2008-2009 are higher level planning estimates.

RATE IMPACTS – TYPICAL 1000 kWh RESIDENTIAL BILL
INCREMENTAL COSTS ASSOCIATED WITH FPL'S
POLE INSPECTION PROGRAM/STORM PREP INITIATIVES/HARDENING PLAN

Wooden Pole Inspections	$0.27 - $0.30
10 Storm Prep Initiatives	$0.20 - $0.22
Hardening Plan	$0.48 - $0.71
Total	$0.96 - $1.22

Note: FPL is subject to a rate agreement that, with narrow exceptions, is not intended to terminate any earlier than the end of 2009. This is also the end of the period (2007-2009) for which FPL is currently seeking approval of its Storm Hardening Plan. Because of the rate agreement, FPL does not expect there to be any rate impact on customers' bills as a result of its storm preparation or hardening initiatives until 2010 at the earliest. FPL does not have enough information at this time to make a meaningful estimate of the impact of the storm preparation and hardening initiatives on residential customers' bills in 2010 and beyond, for several reasons. First, FPL will be filing its 2010 Plan for Commission review and approval in March 2010. Second, at this time, FPL has only limited information on its intended deployment of the Storm Hardening Plan beyond 2009. Finally, for there to be a rate impact on customers' bills, base rates will need to be reset and FPL does not know how costs will be allocated or what the rate design will be in the event that base rates are reset.

In an attempt to be responsive to Staff's inquiry, FPL has prepared an estimate of the impact on the typical 1000 kWh residential bill based on currently approved rate design and allocation methods, using the revenue requirements for FPL's projected incremental capital investment in pole inspections, storm preparation and hardening initiatives through 2009 and the projected 2009 projected operating expenses associated with those initiatives. This is necessarily only a hypothetical and illustrative calculation.

Only the cost impacts associated with the programs have been reflected in the bill impact calculations shown above. The expected savings associated with these programs -- for example, restoration cost savings -- have not been included.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed Pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company.	DOCKET NO. 070297-E1
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed Pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	DOCKET NO. 070298-E1
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed Pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company.	DOCKET NO. 070299-E1
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed Pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company.	DOCKET NO. 070301-E1

TELEPHONIC DEPOSITION OF: JOHN J. McEVOY

TAKEN: By Counsel for Verizon Florida

DATE: September 25, 2007

TIME: 2:32 p.m. to 4:31 p.m.

PLACE: One Tampa City Center
201 North Franklin Street
Tampa, Florida

REPORTED BY: Karen Kay Skeen, RPR
Notary Public
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Lynn Fisher - PSC
Jerry McMullan - FPL
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I N D E X

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The telephonic deposition, upon oral examination, of JOHN J. MCEVOY, taken on the 25th

day of September, 2007, at the One Tampa City Center, 201 North Franklin Street, Conference Room 13-D, Tampa, Florida, beginning at 2:32 p.m., before Karen Kay Skeen, Registered Professional Reporter and Notary Public in and for the State of Florida at Large.

* * * * * *

JOHN J. McEVOY,

being first duly sworn by Jennifer Valerio to testify the truth, the whole truth, and nothing but the truth, was examined and testified as follows:

EXAMINATION

BY MR. O'ROARK:

Q Mr. McEvoy, my name is De O'Roark. I'm an attorney with Verizon. Good afternoon.

A Good afternoon, sir.

Q Mr. McEvoy, have you ever been deposed before?

A Yes, I have, many years ago.

Q Well, since it's been a while, let me cover a couple of basic ground rules. The first is always true, but particularly so today, since you're being deposed telephonically. Please try to give

verbal responses rather than responding with body movements or an "uh-huh" or "huh-uh," if you would, please, sir.

A Okay. Yes, sir.

Q And if I ask you anything that's not clear, you don't understand, please don't hesitate to ask me to repeat the question or rephrase it to

make it more clear.

A Okay.

Q And it may be that your attorney objects at some point during the deposition. Unless he instructs you otherwise, generally please feel free to respond, subject to the objection. It's something that we do to preserve the record. Is that okay?

A Yes, sir.

Q Mr. McEvoy, I see that you have a bachelor's degree in electronic technology. Is that right?

A Yes, it is.

Q Is that an engineering degree?

A It's like an engineering degree. It is -- in technology bachelor's degree, they focus more on the actual method that you use to apply engineering design rather than as much into the

detail that you would go to as far as the specifics behind creating a design.

Q Did you have a specialty within your degree?

A Yes, sir, electronic.

Q Before you began work on the KEMA study, what education or training did you have, if any, in the performance of forensic studies relating to hurricanes?

A Specifically forensic studies in hurricanes, no formal training other than some practice sessions that we conducted internally.

Q Who conducted the practice sessions

internally?
A We did that amongst ourselves in the team that participated in the forensic study.
Q Did you lead those sessions?
A That's correct.
Q What information did you rely on to prepare your team to do the studies?
A We determined what the applicable data would be valuable in trying to determine what are the probable causes of failure. We looked at what information would be useful in trying to determine the causes of failures due to storms. And we also

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compiled a list of equipment that we would need in order to do the forensics.
Q When you say you looked at what information would be useful, did you rely on your own experience, or was there some other source you looked to?
A The source was the folks that were involved with the forensics, my team, the distribution design engineers, as well as our field operational specialists.
Q So it was their collective experience?
A Yes, sir.
Q Did your staff have any other education or training in performing these kinds of forensic studies?
A Not to my knowledge.
Q I gather your team studied both hurricanes Katrina and Wilma. Is that correct?

A Yes, sir.
Q Has your team studied any other storms?
A No.
Q Let's start with the KEMA study. I gather KEMA was hired by FPL?
A Yes, sir.
Q And I noticed that the KEMA report has

both the FPL and KEMA logos on it at the top. Is that correct?
A Yes, sir.
Q Why is that?
A I'm not sure there's any significance to that.
Q What roles did FPL and KEMA play in putting the study together?
A Our role in FPL was to provide KEMA with the data that we collected during the forensic study and to assist them in getting other pertinent information that they felt would be valuable in doing an analysis of our forensic data.
Q What was KEMA's role?
A KEMA's role was to take the data and to review it to come up with findings and to come up with possible ways to move forward.
Q Did KEMA give you direction as to how to conduct your fact gathering?
A No. KEMA came in after we had already gathered all the facts.
Q Which counties were studied as part of the KEMA review?
A We had actually four counties that we

dispatched teams to: Monroe County, which is on the

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West Coast, we had the team in, and one team in Dade, one team in Broward, and one team in Palm Beach.

Q And I guess you would make clear -- excuse me. I guess we should make clear that the KEMA study was on Hurricane Wilma?

A It looked at both Hurricane Katrina and Hurricane Wilma, although it did concentrate heavily on Wilma.

Q What counties did Wilma affect in FPL's service territory?

A The counties I previously mentioned, and it probably affected a little bit of Martin County, although we did not do forensics in Martin County.

Q Why did you not do forensics in Martin County?

A It was a matter of the severity of the storm up there and the manpower we had available to do forensics.

Q When you say it was a matter of the strength of the storm, to paraphrase, what do you mean?

A The damage that our system incurred in Martin County was lesser than the other counties.

Q Do you know why that was?

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A Because of the severity of the storm is the assumption.

Q Of the areas that you studied, were there

any areas that had Grade C construction?

A Palm Beach County west of the turnpike had Grade C constructions for the years -- it was '93 through 2004.

Q How about Monroe County?

A I'd have to look at the map to refresh myself.

Q Do you have that available to you?

A Yeah, let me find it in the KEMA report. No, Monroe County has always been Grade B construction.

Q I probably should have asked this before. What materials do you have in front of you, Mr. McEvoy?

A I have the KEMA report, a copy of the National Electric Safety Code, my rebuttal testimony, Dr. Slavin's testimony and Mr. Harrelson's testimony.

Q Can you please refer to your rebuttal testimony, looking at Page 7.

A Yes, sir.

Q At Lines 11 to 13, you state that you

managed an effort to develop a systematic approach for evaluating the root causes of equipment failure during hurricanes. Can you please describe the systematic approach you developed?

A We developed a process on what we would do when we found a damaged piece of equipment as part of the forensic effort. The process went through that when you first arrived at a damaged area, whether it was a pole or a wire down, you

would do kind of a general observation of the surrounding terrain. You would then go to the damaged equipment, and we had a form that we used to fill out that had information such as the latitude and longitude of that damage, the type of equipment damaged. If it was a pole, for instance, we would try to get the brand on the pole, meaning what class pole it was, what was the age of the pole, who owned that pole, what equipment was on the pole, what wire sizes, pertinent information such as span lengths. And then we would also ensure that we took at least two pictures at each location.

If there was evidence that perhaps there was some deterioration, we would dig around the pole, if you will, and try to determine the amount or the presence of deterioration on the pole, I

think. But generally speaking, we had a form that we used to fill out to take down all of this data.

Q Was there any other aspect of your systematic approach that you all followed?

A I think we had a process to where we would GPS track ourselves as we went through the areas. Each team was assigned a county. And generally speaking, the team would either cross east to west and do that until it felt that it had a representation of that county. And then it would start from north to south so that we would try to get as much as possible a representation of the damage, all of the damage in that county.

Q Were the teams traveling by vehicle or on

foot?

A No, they were by vehicle.

Q So were they observing poles along highways primarily?

A Yes, sir. We started out -- our intent, again, was to -- we realized that we had to get to the damage before our restoration crews arrived. And the way we typically initiate restoration after a storm is we try to restore the feeder poles in a priority order. So we started on the main thoroughfares with forensic data on any damage to

feeder facilities.

Q Did you typically look at feeder facilities before lateral facilities then?

A In the early stages of the forensic effort, that's correct.

Q Did you have a standard for the area around a pole that you observed? Was there some radius that you determined was relevant?

A It was usually the span length to the adjacent pole. Unless there was, you know, some characteristics such as either open field, open body of water, a berm, trees, buildings, any kind of construction of the buildings that would be inherent to debris damage, such as metal roofs.

Q For example, if you had a pole line that was adjacent to woods, would you go into the woods some distance to see what you could find?

A No, we would not.

Q You described the checklist or maybe at some point you referred to it as a cheat sheet in

your testimony. Was that your team that pulled that together?

A It was a checklist. And, yes, it was our team with the help of some of our operations specialists pulled that together.

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Q How long after Hurricane Wilma passed was it before your team started off?

A As I recall -- I'm trying to remember Wilma, whether she broke -- whether the all clear was given in the afternoon. It was right after the all clear. I don't recollect whether it was the same day after the all clear or the morning thereafter.

Q How long did it take to collect the data after you commenced the work?

A We had a total of 16 days of observations during Wilma.

Q Were they consecutive days?

A Yes, sir.

Q And were all four of your teams out in the field for all 16 of those consecutive days?

A There were several days when one of our teams were pulled in for some media participation.

Q Is it true that "Wind Only" was the default option if your team couldn't identify any other cause of the pole damage?

A As we went through our investigation at a particular site, we strived as best we could to determine if there was an identifiable cause. If there was no identifiable cause and the equipment

that we were observing didn't have any damage other than what it would sustain when it hit the ground, then that is correct, it went to "Wind Only."

Q Let me ask you to turn to Page 9 of your testimony, please.

A Okay.

Q There you list multiple factors that you say compelled the conclusion that the force of hurricane winds on the poles caused them to fail. Do you see that?

A Yes, sir.

Q I'd like to go through those one at a time. With the first one, you say that in almost all cases, the pole was broken at least one foot above ground level. What is the significance of that observation to you?

A When you have a pole that is broken from a load sustained on it, if there is any deterioration that is a contributing factor to it, you will have that pole break at ground level. If it breaks above level, that is a very good indication that that pole simply saw a force exerted on it that it was not capable of withstanding.

Q What is the basis for that conclusion?

A Based on our observations of poles that

have broken over the years for various reasons.

Q Is that because you saw poles while they were breaking and were able to reach that conclusion?

A I have witnessed poles being broke as

part of acceptance testing. But it also has to do with follow-up with some tornado activity that has occurred on our system.

Q The next factor has to do with the age of poles. You say that a significant number were relatively new?

A Yes, sir.

Q Do you have a percentage of the poles that you considered to be relatively new?

A Not offhand. But I seem to recall when we did that, there was -- no, I don't remember the percentage.

Q Was it more than 50 percent? Do you recall?

A It seems to me it was right around 50 percent, but I -- I don't recall that percentage.

Q And your conclusion is that that would rule out deterioration as a factor, I suppose?

A Those poles that were that young were all what we call CCA poles, which is the type of pole

that we purchase now. And they showed absolutely no signs of any type of deterioration.

Q What does "CCA" mean?

A Copper chromium arsenic. It's a treatment process that is used for a wood preservative.

Q And that's as opposed to creosote?

A Creosote is another wood preservative, yes, sir.

Q And that's what you used previously?

Hearing Exhibit - 000757

A Yes.
Q The fact that what you consider to be a significant number of poles was relatively new would not rule out windblown debris as a factor, would it?
A In and of itself, no.
Q Next you note that none of the poles had the presence of wood decay.
A Yes.
Q Again, that would not rule out windblown debris as a factor?
A By itself, it would not, no.
Q And let me just make sure I understand your testimony on that point. Are you saying that of all the poles that all your teams inspected, you didn't find any wood decay in any of the poles?

A No. Are you referring to the poles with wind only as the cause or all the poles that we observed?
Q I guess that's what I'm asking you. I'm trying to understand what you're saying there.
A No, this refers only to the wind-only poles.
Q I see. Next you say that in the majority of the cases, the surrounding terrain was not cluttered, which you say precluded the possibility of something getting into the lines causing damage. Do you see that?
A Yes, sir.
Q You say "the majority of the cases." Do you have a percentage there?
A No, sir.

Q Something more than 50 percent, but you can't be any more specific than that?

A That's correct.

Q Were there instances where you found cluttered terrain but still concluded that the pole failed because of wind only?

A Yes, there were.

Q Why did you conclude that wind only was the cause in those situations?

A For the same reason as the other situations, there was no damage to the facilities that had been caused by other than when the facilities struck the ground. There were no evidence of any large trees or any amount of debris in the area that could have possibly affected this pole.

Q Is it possible for windblown debris to strike conductors, place stress on poles, and then for the debris to be blown away far from the site?

A I suppose it's possible, yes, sir.

Q If in that case the debris caused pole failure, your team nonetheless would have marked the incident as a wind-only failure if there were no other indications?

A I don't believe so. Because, again, we would look at the facility for obvious damage to either our conductors or the poles or our equipment that was caused by something other than that when it hit the ground. And usually when you have -- especially if you have debris hit either wire or a

pole, you'll have some telltale signs of either broken strands of the wire or some gashes in the pole that would indicate something had hit that.

Q The last factor you have is that, I guess

what you just mentioned, that there were no signs of damage. You don't say how often that was the case. Was there no sign of damage in each of the wind-only instances that you identified?

A Again, I'd have to default to the majority of the time, there was no other -- I can't give you a percentage, but the majority of the time there was no other damage; in fact, most of the time, yes, sir.

Q Were there instances where you saw indications of damage but nonetheless concluded that wind only was the cause?

A Not to my recollection.

Q I'm trying to reconcile your two responses. You said that you couldn't rule out -- well, you said that in the majority of cases, there were no indications of damage.

A Well, the only thing I can speak to is what I personally saw. I haven't questioned my team as to that same question. So I feel not confident in answering for them. That was the instructions. And, again, to my knowledge, they were followed.

Q What was the instruction?

A The instructions were to go ahead and look at the facilities carefully to determine was

there any damage that was caused other than when

that facility hit the ground, and if so, what was the damage and what caused it.

Q As you sit here today, though, you don't know whether the people on your team might have noted damage and yet still concluded that wind only was the cause?

A I can't swear to that. That is certainly my conclusions. And in all the discussions we had during the recap of the data, that is what I was told.

Q Mr. McEvoy, at Page 10 of your testimony, Line 22, you state that the force and character of the winds experienced during Hurricane Wilma were typical of what could be expected of a storm of Wilma's strength. Do you see that statement?

A Yes, sir.

Q What is the basis for your statement?

A There wasn't any indication from meteorologists or any of the weather folks that we talked to that the winds of a Category 2 or 3 storm such as Wilma would be any different than any other Category 2 or 3 storms.

Q So one source of your conclusion is discussions with meteorologists?

A Yes, sir.

Q Was there any other source for your statement?

A No, sir.

Q Is it your opinion that all storms of Wilma's strength have the same characteristics?

MR. BUTLER: Can you explain what you mean by "characteristics"?

MR. O'ROARK: Sure. Let's try it another way.

Q Assume that there was another storm of the same strength of Wilma, the same size and the same pathway. Assuming that those characteristics were the same, would that storm be identical to Wilma as far as you're concerned, or would it be possible that there were idiosyncratic differences?

A I'm not really an expert in that area. But all things being equal, being the same storm, I would suspect yes, it would be the same.

Q I think you said you had the KEMA study in front of you?

A Yes, sir.

Q Can you turn to Page 77, please.

A Okay.

Q At the bottom of Page 77, there's a

statement that "These findings virtually eliminate the potential Grade C construction as a contributing factor." What is meant there, if you know, by "the potential Grade C construction"?

A What KEMA tried to do was to look at the areas of our service territory that had been designated as Grade C areas versus those that had Grade B areas that were exposed to the hurricane force Wilma winds. And looking at that, further up in that paragraph, they make statements as to comparing to Broward County, which was a Grade B area, what was the damage sustained there. They

made reference to poles that were in the western parts of Palm Beach County that in their statement they say most likely complied with Grade B construction standards, and they were trying and made comparisons of the type of damage or the amount of damage when looking at those facilities. And as a result of the look at those two situations, they came up with the statement that it virtually eliminated the potential Grade B construction as the contributing factor.

I think where I need to go with that is we in Florida Power & Light went to Grade C construction in '94, and we kept that through 2004,

I believe were the dates.

If you go to Page 14 of the KEMA study on -- I'm sorry. Are you there?

Q I'm here.

A Okay. If you look at the second paragraph from the bottom that starts with, "Therefore, the present design standard" --

Q Yes.

A In that paragraph, as you read through it, we did a study about four years ago that compared Grade B and Grade C construction in our service territory. And at the conclusion of that study was when we went back to Grade B construction for all of our territory. And reaching that conclusion was largely driven by we took a snapshot of some facilities that had been constructed in our Grade C area, and we found that 12 out of the 14

that we inspected, even though our facilities could be built to Grade C, they were in fact built almost to Grade B. We called it like a Grade C-plus-plus. And in realizing that, we kind of thought through, "Well, why is this happening?" And it turns out that especially in Palm Beach and Martin County, which were counties that were split as far as grades of construction, that the material that we used

usually throughout that area, such as the size of the pole, we tended to use the same size pole whether we were building in a Grade B or a Grade C.

What that really means then is that in order to build to a minimum Grade C standard, you would have to have extremely long span lengths. And in the area of Palm Beach County out to the west, that is an area that is growing rapidly. And really your placement of the poles is not so much dictated by what you're allowed to do by your grade of construction, but it is more dictated by the physical characteristics that we have to install these lines in, such as lot lines, such as poles that need transformers on it to pull off the businesses, laterals that we need to pull off.

So all of this kind of drove our design folks, even though they could use Grade C, we were building facilities that were equal to Grade B in most cases.

So with that as a background, it really is not a valid comparison to look at Florida Power & Light's Grade B construction compared to Florida Power & Light's Grade C construction, because in

reality, there was not a whole lot of difference in those.

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Q All right. Let me make sure I understand. You had some Grade C poles in Martin County. Right?

A Well, I guess the term "a Grade C pole," there really isn't a Grade C pole as such. You use a pole and you design the system around the grade of construction. And the type pole you use can be any one of many types. So there's no such thing as a Grade C only pole, if you will. It's the entire system construction.

Q Okay. Let me make another run at it.

A Okay.

Q There was some Grade C construction in Martin County from '93 to 2004. Correct?

A Martin County was -- part of Martin County from the turnpike west was designated as a Grade C construction area. Whether or not we actually built any facilities to the minimum standards of a Grade C, I'm very doubtful.

Q Are you certain or do you have records that would establish that, in fact, in that portion of Martin County, the construction met Grade B standards?

A I have not seen records that would confirm that conclusively. We have the results of

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the study that we did comparing Grade B and Grade C construction for all of the Grade C area.

Hearing Exhibit - 000765

Q In any event, you didn't study Martin County as part of your analysis?

A I don't recall if any of those 14 sites was in Martin County, no, sir.

MR. BUTLER: I'm sorry. When you say "as part of your analysis," what analysis are you referring to?

MR. O'ROARK: I'm really referring to the fact gathering. I understood Mr. McEvoy's previous testimony to be that they studied four counties and they did not study Martin County, even though there were some effects from Wilma there.

MR. BUTLER: Again, I think he was just answering about this comparison of the construction to the Grade B or Grade C. You're back talking about the analysis, the data gathering, for the forensics after Hurricane Wilma. Is that right?

MR. O'ROARK: Yes.

THE WITNESS: Sorry. I missed that transition.

BY MR. O'ROARK:

Q Yeah. I mean, the basic question was you all did -- at least your design standards called for minimum Grade C construction in Martin County. But you all did not study Martin County. Is that fair?

A In portions of Martin County, not all of Martin County, and we did not do forensics in Martin County, that is correct.

Q And then for Palm Beach County, your

design standards called for minimum Grade C construction standards west of the turnpike, I believe you said?

A Yes, sir.

Q And you did study or gather information for Palm Beach County?

A Yes, sir.

Q And you gave a fairly long explanation for what Grade C meant to FPL from 1993 to 2004. I'm not sure I understood all of it. Is it your testimony that, in fact, FPL was following Grade B construction standards during that time?

A For the area in Palm Beach County that was designated as a Grade C construction area, that grade of construction would have started out as the basic design. However, as the service planner design engineer would have completed his

construction, they would have went out to the field to determine the actual placement of the poles. It would be at that point in the process where they would determine whether or not the poles could be placed based on the maximum spacing allowed for a Grade C design.

And in the instances that we looked at areas that were allowed to be designed to Grade C construction, due to other factors such as lot lines, such as transformers, such as service drops, such as laterals, such as intersections, you rarely were able to obtain the maximum span length that the Grade C construction indicated you could achieve.

So the poles were spaced less than what Grade C construction would allow. That resulted in the construction being stronger than Grade C. And, in fact, in 12 out of the 14 cases we looked at, it was Grade B equivalent.

Q Was it nonetheless the case that even as applied, the construction standards in the western portion of Palm Beach County were lower than the eastern portion?

A In the eastern portion of Palm Beach County, they would start with a Grade B construction. On the western portion, they would

start with a Grade C. The resultant facility put in the ground was not a whole lot different.

Q But to the extent there was a difference, the grade of construction was lower in the west than the east?

A The allowable grade of construction was, yes.

Q How about as applied?

A Again, due to the factors that I mentioned, the fact that you have to place your poles closer together when you have a more urbanized area because you need transformers, you have more intersections to deal with, you have laterals to pull off, and you just could not get the spacing that Grade C would allow.

Q In the east, did you sometimes design above what was required by Grade B?

A That is yes, that is affirmative. In fact, we're finding that out more and more as we go

back to harden some of our existing facilities, that we have poles that do, in fact, meet a higher standard than Grade B, yes, sir.

Q So is it not possible that the poles in the east are stronger than the poles in the west?

A Again, the concept of a stronger pole is

not one that I'm familiar with. It's the grade of construction that you're having to deal with. So --

Q Let me try again. I take your point. Is it not possible that the grade of construction was stronger in the east than the west?

A It is possible. But in reality, based on the analysis we did for Grade B and Grade C design, they were very similar in nature.

Q The KEMA study found that there was no difference between east and west as to how they responded to the storm. Is that right?

A The KEMA study set virtually eliminates the potential of Grade C construction as a contributing factor. And, again, that was based on Broward County poles having a failure rate pretty much like the poles in Palm Beach County.

Q The KEMA study concluded that more than 85 percent of pole breakages in the western part of the tri-county area involved multiple breakages. Is that right? I'm looking at Page 80.

A I'm sorry. Which page?

Q 80.

A 80.

Q If you go down to the fourth paragraph.

Hearing Exhibit - 000769

A Yes, sir.

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Q And just so we're clear, the tri-county area is what?

A It would be Miami/Dade, Broward and Palm Beach County.

Q Did your team determine that those multiple breakage incidents were based on wind only?

A The process that was used by the team when we came across an instance where either two or more poles broke in line was to observe the entire pole breakage of that particular instance, whether it was two poles or ten poles or twenty poles. So what we would do is we would walk that entire pole line, looking for any evidence of something that caused a pole to break, very similar to what we would do with an individual pole; we would, in fact, look at each one of the poles in those breaks.

And if we found a factor that caused one of those poles to break, such as a tree or debris, then we would -- as we did the individual observations for each one of those pole breaks, we would assign that same cause to each one of those pole breaks.

Q Was it your team's conclusion that in each case of multiple breakage incidents, that wind only was the cause?

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A Not in each case, no, sir. In the majority of the cases, but not each case.

Q Now, I gather that as Wilma moved toward the East Coast, most of the pole breakages were from

falling trees and deterioration. Is that --

A I'm not familiar with that conclusion, no.

Q Let me direct your attention to the sixth -- whoops, no. Well, I'm having trouble finding my spot there, so I'll move on.

Are there more trees in the eastern part of the tri-county area than in the western part?

A I don't have an answer for that question.

Q Are you aware of any difference in landscape in the tri-county area from one part to the other?

A "Landscape" meaning?

Q Trees, open spaces versus wooded spaces.

A As a general statement, no, I can't say as though I am.

Q Actually, I found my spot, Mr. McEvoy. Thanks for bearing with me. If you go down to the fourth paragraph under 7.5 on Page 80, it's the one that starts, "Wilma traveled from west to east."

A Okay.

Q And as it goes along, it says that Wilma lost strength, moved toward the East Coast. Then the next sentence says, "The relatively small amount of pole breakages in these areas was mainly due to falling trees and creosote feeder poles with presence of some level of deterioration." Do you see that?

A Yes, sir.

Q Is that consistent with your observations

after the storm -- or your team's observations?
A If -- you know, KEMA looked at the data and reached that, so I would have to go with their conclusion. But I don't recall the team ever discussing that particular statement.
Q Are there more feeder poles in the western part of the tri-county region?
A No. In fact, there would probably be more in the eastern because it's more heavily populated, so that's where you would have more feeders. You usually have a different voltage in those areas, and the 13 kV volts requires more feeder poles, more prevalent in the eastern part.
Q I gather feeder poles tend to be larger as they're designed by Florida Power than lateral poles?

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A They tend to be larger due to the fact that, yes, they're required to carry larger wires.
Q And more feeder poles failed than lateral poles during Wilma. Is that right?
A I don't remember. That may have been the case, but I don't remember that offhand.
Q Your group also studied Hurricane Katrina?
A Yes, sir.
Q Did you use the same type of forensic approach?
A It was much the same. It was not quite as refined as we got with Wilma because Katrina was the first time that we had did this. When I say "refined," we upgraded the data sheet that we used

for collection purposes was the main difference.
Q And what changes did you make to the data collection sheet?
A We started gathering a lot more information about what equipment specifically was on the pole, more information about surrounding terrain, that type of information. And we also settled on a specific number of -- a minimum number of pictures to take at a particular location.
Q Do you remember the month and year of

Katrina?
A I don't know off the top of my head, but I believe it was August of 2005.
Q Okay. And how much later was Wilma?
A Wilma was in October. That one I remember.
Q What counties did you study as part of your Katrina evaluation?
A Only Miami/Dade County.
Q Did you use four teams as you did with Wilma, or was it a smaller group?
A We used three teams. And we did -- let me go back and change that. We did do a little bit of forensic data in Broward County, southern Broward County.
Q Now, I gather that after your work on Hurricane Katrina, you still believed that trees and debris were the major causes of broken poles during the storm?
A Yes, sir.

Hearing Exhibit - 000773

Q And your study of Hurricane Katrina was consistent with that conclusion?

A Yes, sir.

Q Looking again at Page 80, the KEMA report concluded that most pole breakages from Katrina were

from falling trees. Is that right?

A Yes, sir.

Q And that was based on your group's observations?

A Yes, sir.

Q Why are you relying on Wilma rather than Katrina?

A What do you mean by "relying on Wilma"? I don't understand the question.

Q You've got one storm where you've concluded the cause was mostly from downed trees and another storm where KEMA has concluded that the cause was often wind-only damage. Why is FP&L basing its storm hardening plan on the conclusions from Wilma rather than the conclusions from Katrina?

A I think when you look at how different categories of hurricanes are going to affect your system, it is very logical to assume that if you have a lower Category 1 hurricane such as Katrina was, that a preponderance of your damage would be caused by something other than your facilities failing due to wind only, due to the fact that with Grade B construction, that should be able to withstand well -- well, not "well" -- but should be able to withstand more than 100 miles an hour. In

Katrina, the winds never reached anything near that velocity.

In Wilma, although we had a storm there that did a lot more damage, it was much more widespread and it was typical of the damage that our system would sustain with that level of hurricane. When you look at the basic wind map in the National Electric Safety Code and you realize that our service territory can get anywhere from 105-to-145-mile-an-hour wind, and specifically in Dade, Broward and Palm Beach, you're looking at 145-mile-an-hour winds, it would not be logical to design a system to withstand a Category 1 Katrina storm when you had a 50-year wind map that indicated you could expect much worse, and in fact we had had much worse in 2004 and 2005.

Q Do your studies show that certain parts of your territory are more subject to stronger Wilma type storms than other parts of your service territory?

A No, sir, we didn't study that. We're relying on the National Electric Safety Code Wind Map.

MR. O'ROARK: Okay, Mr. McEvoy. Thank you very much. That's all I have.

THE WITNESS: Yes, sir.

MR. SEIVER: Are we off the record for a minute?

MR. BUTLER: That would be fine.

(Recess from 3:21 p.m. to 3:26 p.m.)

MR. SEIVER: This is John Seiver. I'm ready to go if Mr. Butler and the witness are ready.

MR. BUTLER: We are.

MR. SEIVER: Excellent. And is staff on?

MR. YOUNG: Staff is here.

MR. SEIVER: Okay. Well, I guess then we're ready to go.

EXAMINATION

BY MR. SEIVER:

Q Good afternoon, Mr. McEvoy.

A Good afternoon.

Q My name is John Seiver. I'm one of the co-counsels for the Florida Cable Telecommunications Association. And I'm going to ask you some more questions, as Mr. O'Roark did. And the same ground rules apply. If you need me to rephrase a question or you don't understand it or there's some static, it can always be repeated. And whatever materials

you may be looking at, if I direct you to a particular portion or a page, always feel free to consult whatever it is you might need. Okay?

A Okey dokey.

Q All right. If we start out with your rebuttal testimony, if you would please turn to Page 3.

A Page 3.

Q Down near the bottom, starting with Line 20, you have a sentence that goes on to Page 4 -- I'm sorry. The sentence ends on Line 23, and then

another sentence begins on Line 23 going to Page 4. And I wanted to use -- you to focus, rather, on the phrase "hide behind" when you say, "FPL cannot ignore direct relevant data and hide behind the general 60-foot exclusion in the NESC." What did you mean by and why did you use the term "hide behind"?

A What we're referring to there is when you have information that leads you to the conclusion that you should be doing something other than or stronger than or more than any national standard, that if there is something in that national standard that gives you an out, that you shouldn't use that out and ignore the data that you have.

Q Well, is the fact that the NESC did not apply extreme wind to structures -- pole structures 60 feet and under in your mind a, quote, out, end quote?

A No, sir. It's just the way the NESC phrases that is it's not required for structures below 60 feet. It doesn't say that you cannot use it or you must use it or you shouldn't use it. It just says that it's not required.

Q And are you familiar with a debate over whether or not the extreme wind design factor should be applied to structures 60 feet and under?

A Somewhat familiar --

MR. BUTLER: I'm sorry. I'm going to have to object to the question. What debate are you referring to, John?

MR. SEIVER: Well, I was referring to the debate that I think went on pretty long this morning with Dr. Slavin. If the witness knows what I'm talking about in the Subcommittee 5, that's what I'm referring to.

MR. BUTLER: So the debate over whether NESC should adopt as its standard, you know, EWL design for facilities under 60 feet?

MR. SEIVER: Well, I was kind of hoping

I would get an answer from the witness, Mr. Butler. But if -- whatever he understands. If he understands there's a debate, I wanted to have his understanding.

A I'm not familiar with the deposition for Mr. -- or Dr. Slavin this morning. But I am familiar with comments that are fed back to the National Electric Safety Code Committee as they are considering different change proposals and generally familiar with responses back to the change proposal concerning the 60-foot exemption.

BY MR. SEIVER:

Q Has Florida Power & Light urged the subcommittee to change the code so that extreme wind would apply to structures 60 feet and under?

A No, we have not.

Q If you would turn to Page 4 of your rebuttal testimony, please, Mr. McEvoy.

A Okay.

Q There's a question that begins on Line 14, and this is generally talking about the FCTA's procedure for including or measuring -- I'm sorry.

I'm looking for words now -- for utilizing the guying effect of supply wire. Do you see that?

A Yes, I do.

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Q And I see in your answer that responding to the question about the NESC approval that it has not approved it. But my question is more specifically do you know or agree -- I'm sorry. Let me restate that.

Is there a guying effect of supply wire and telecommunications wire cable?

A We are presently trying to make that determination. In the gut check, it sounds like there's room there that we can use. But until we can pin it down more specifically to what formula, to what extent that a guying effect of either our facilities or any attaching facilities have on the strength of our facilities, we really can't put it as part of our basic design standard. We have had a lot of internal conversation about this, and we have actually gotten with our software design vendor, and we're having them run various scenarios based on the sag of our lines, based on the way we attach our lines to poles to try to determine is there a way that we can take advantage of this.

We are also -- we have conducted tests internally to try to determine whether or not the way we attach a wire to an insulator and also the way we attach the insulator to the pole, whether

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that would, in fact, be strong enough to withstand

Hearing Exhibit - 000779

the criteria that you use typically for a guy wire.

So I think conceptually we're just not at the point where we have data that would support conclusively that we could use those facilities as guy wires.

Q Thank you. And I note you mention these discussions with your software vendor on Page 6 of your rebuttal testimony.

A Yes, sir.

Q And my question would be -- and I presume you would have told me -- but have you been making progress in those discussions?

A We've had several phone conferences to where we've discussed specifically, you know, how you would go about that. And as of yet, I can't report that we've had any breakthroughs, no. But the design software vendor is running scenarios.

Q Might we have any breakthrough or do you expect any results before the hearing next week?

A I would doubt they would be that soon, sir.

Q All right. Thanks. If you go on to Page 7 of your rebuttal testimony.

A Okay.

Q In Line 5, you're giving an answer where you discuss a cable with .59-inch diameter on a typical span of 200 feet.

A Yes.

Q Let me just ask you first, is a 200-foot span generally something you associate with Grade B or Grade C construction?

Hearing Exhibit - 000780

A A 200-foot span could be either.
Q Could be either?
A Yes.
Q But generally, the longer spans are Grade C?
A Well, when we're talking about longer spans with Grade C, you would be typically looking at 300, 350 foot, something like that. But 200 foot could happen.
Q Could happen for Grade C. But the calculation here for the square footage of the -- of this cable and this 200-foot span is something a little just under 10 square feet?
A Yes, sir.
Q Now, you add a phrase in there, you say "can catch wind like a sail." Would the ability of this wire over a span of 200 feet in that square footage put the same -- experience the same wind

force as the same amount of square footage in a more rectangular or a squarer configuration?
A If it was of equal square footage, yes, sir.
Q There's no difference in the fact that the wire is only .59 inches thick over 200 feet versus a 3-foot-by-3-foot square?
A Well, you're basically looking at the profile that is visible to the wind. And the only difference in the wire would be is it would be spread out over a longer distance than in the actual square that you're discussing.

Q And there's also a different profile for round objects in extreme wind as opposed to either square or flat objects. Isn't that right?

A That is correct.

Q So for this sail -- for this to catch wind like a sail, would it not have to change its round characteristic as far as the profile of putting it to the wind?

A There would be a shape factor involved with that, yes, sir.

Q As you go on to Page 8, there's a set of questions -- there's a question and answer starting on Line 14, and you begin talking about the KEMA

report. And I wanted to ask you some more questions about the KEMA report that I believe Mr. O'Roark had spoken to you about.

Were you responsible for providing any of the data to KEMA for purposes of their analysis?

A Yes.

Q And did you have any role or participation in formulating any of the conclusions that appear in the KEMA report?

A No, sir.

Q Did you have any input into the formulation of those conclusions?

A We had a review process.

Q Was there any change in the conclusions during that review process?

A No, sir.

Q Are there earlier drafts of the KEMA report that show where any changes were made?

Hearing Exhibit - 000782

A Not that I can recall.
Q I want to turn our attention now to the KEMA report. Do you have that handy?
A Yes, sir.
Q The first thing I wanted to ask you about is on Page 60.
A Page 60? Six zero?

Q Six zero, yes.
A Okay.
Q And I wanted to ask you a little bit about this particular Table 7-8. Do you recall looking at this table before?
A Yes, sir, I have seen this.
Q Would it be fair to say as you look at this table that in Hurricane Wilma, 50 percent of the concrete feeder poles that broke broke due to wind only?
A Yes, sir, that's what the table indicates.
Q And that 35 percent -- I'm sorry -- 36 percent of the concrete feeder poles broke due to trees?
A Yes, sir.
Q And would it be fair to say that in the lateral poles just under it that -- well, I guess there were two poles that came down for wind only. That was two-thirds of the three poles that came down. Is that right?
A Yes, sir.
Q Does this give you any indication that

Hearing Exhibit - 000783

building to extreme wind by using concrete poles is not a viable method of meeting the extreme wind of a

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hurricane like Wilma?

A No, sir.

Q And why not?

A The concrete poles that were broken during Wilma were a type pole that we call a 3-G, which are basically a wood-equivalent pole. They are designed to be the strength of between a Class II and a Class III wood pole. In a lot of our municipalities, they require for aesthetic purposes that we use concrete poles. So in the past, we had used these 3-G poles, but we didn't have them at the strength of the poles that we are using for extreme wind or for other construction, which is typically a 3-H pole or larger.

Q Okay. And none of the classes of the concrete feeder poles are listed in this table, but you recall this just from your own experience?

A Yes, sir. We had a pole pile for many months that I reviewed. And the concrete poles, 95 percent, 98 percent, were 3-G poles.

Q And if we move up in this particular -- oh, I'm sorry. Let me ask you, when you used the concrete feeder poles in the examples that you were given, do you know what grade construction they were achieving?

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A I would guess they would be Grade B.

Q You don't think that they were B-plus or B-plus-plus?

Hearing Exhibit - 000784

A I couldn't -- I couldn't answer that. No, I wouldn't think they would be.

Q If you would move up to the CCA listings for feeder and lateral.

A Yes.

Q You'll see that CCA feeders, that 76 percent of the poles that came down in that category came down from wind only?

A Yes, sir.

Q But laterals, only 24 percent came down in wind only?

A Yes, four of them.

Q And if you go over to the "Tree" column, you'll see that for feeder, it's reversed; it's only 14 percent came down for the feeders due to trees, but 53 percent of the laterals did?

A Yes, sir.

Q Does that give you any indication that perhaps building to extreme wind or additional strength in the lateral part of the network would not be reasonable?

A I think what that indicates to me is the

preponderance of these lateral poles were what we call our rear line or rear lot construction, they ran behind the house. It's a type of construction that we have shied away with for some time now. And normally in those situations, you will find the single phase laterals, if you will, which means that you only have one wire or one energy wire or one neutral wire on that pole plus whatever attachments

you may have. But, yes, it is more likely that those poles are going to fail from trees because they're usually a lot shorter and they are down into the tree line. And that's partly why we are really concentrating our effort on hardening in the areas of feeders, and that's what we're looking at hardening first.

In the areas of laterals, the predominant construction that we have for our laterals now are underground, and most of our feeders are still overhead. But when we do a lateral overhead, we do it in the front line now, which means it is on the street, as our feeder poles would be. And normally speaking on the street, you're going to encounter less trees than you do in the rear.

So going forward with any lateral construction that we may do, what we're doing now is

that tool kit that I believe Mr. Miranda talked to you about, and we're designing based on what we call a Class III wood pole, which may or may not bring it up to extreme wind.

Q As far as the CCA type poles, are they generally of a more recent vintage than the creosote?

A Yes, sir. We started purchasing CCAs in 1978.

Q And is that also an explanation why there's less presence of deterioration in the poles that are listed in the next column for CCA versus the creosote?

A I think it's a combination of newer and

CCA has been a much better treatment for us.

Q As far as Wilma's data though -- and we've talked about some of the data already -- if you look on Page 60, if you go down below the Katrina chart, the second line of the text, it says, "Hurricane Wilma broke more poles without any indication of presence of deterioration or falling trees." Do you see that?

A Yes, sir.

Q And further down in the last paragraph, the second sentence is, "The first falling trees

affected lateral poles much more than feeder poles." Is that right?

A Yes, sir.

Q Is it your understanding then that it would make more sense to build to extreme wind in areas where the poles that are 60 feet and under would not be exposed to falling trees?

A Could you repeat that, please?

MR. SEIVER: Could the court reporter just read it back? I'm not sure I remember it exactly.

(Reporter reads as requested.)

A As far as the -- I guess we're getting to the shielding effect or the effect of a tree falling on a pole versus the effect of wind on it. That is another area that we're trying to come to grips with better. It's difficult for us to contemplate when you have hurricanes that come from any different direction, wind speeds that change. Generally

speaking, our lines may have trees on one side or the other, but rarely do they have it on both sides of the line. So not knowing or not being able to control which way the wind is going to blow on that line, it's just not a dependable type of situation you can look at.

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I can also tell you from personal experience that in my neck of the woods here, we got exposed to Jeanne and Frances in 2004 and then Wilma in 2005. And I know I have far less trees on my block now than I did three years ago. So trees can disappear for various different reasons. So taking the shielding of a tree into effect is something that we're interested in looking at, but we're not sure exactly how to account for that.

One area that we are exploring, if you look at the basic wind map in the National Electric Safety Code, the first note on that map indicates that those values are based on 10 meters or 33 feet above ground, and they are also based on Exposure Category C. Exposure Category C relates back to the American Society of Civil Engineering Standards where they have different exposure categories. Exposure Category C as defined by that standard is basically a landscape that has obstructions, trees, vegetation, not in excess of 30 feet.

There is another exposure category, which is -- well, there are several, but the one I'm going to refer to is Exposure Category B that reflects landscape conditions that would be more prevalent in a more urban type environment. They have some

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specific guidelines on when you can apply that exposure category. But what we're trying to do moving forward is to see if there is any possibility of somehow defining different exposure codes rather than trying to come up with some mitigating factor of the shielding effect of trees on our own.

Q As a general matter, Mr. McEvoy, would you agree that the tree density or the trees per mile in FPL service territory is twice the national average?

A I have no idea, sir.

Q Do you know a Ms. Geisha Williams?

A Yes, I do.

Q Have you ever had the opportunity to read any of her testimony before the Florida PSC with regards to the FPL's Petition for Issuance of a Storm Recovery Financing Order?

A Yes, I did, but I really can't recall the content of it.

Q Would you accept, subject to test, that her testimony included that statement that the tree density is twice the national average?

MR. BUTLER: John, you had earlier said that the witness should have the opportunity to look at the context of something. I really

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would appreciate it if you want to refer to her testimony to, you know, show it to him or at least to read to him what you're referring to.

Hearing Exhibit - 000789

MR. SEIVER: All right. This is about FPL's successful vegetation management program. And I was just reading the one sentence. I can understand the context being the performance of FPL's system in hurricanes and -- I'm sorry -- or related outages due to vegetation in '04 and '05. And actually, John, this was a document that you produced to Ms. Browne, I think, when she was there last week, FPL -- the Bates number stamped on it is three zeros and 403.

Would you want to take a minute to try and get that? Would that make it quicker? Because I only have one more question on that page.

MR. BUTLER: Okay. Now, why don't you defer that, and we'll see if we can get -- it's 000403?

MR. SEIVER: Correct. Okay. I can move on.

MR. BUTLER: We can come back to it as

soon as we have that page.

MR. SEIVER: All right. Thanks.

MR. BUTLER: Thank you.

BY MR. SEIVER:

Q Well, let's leave the page we were on. And on Page 62 of the KEMA report, going on to Page 63 --

A Okay.

Q -- Mr. McEvoy, if you look down near the bottom, there's a discussion about the different

pole failure rates, and it goes on to Page 63. And I wanted to just make sure I understood, at the top of Page 63, the first complete sentence starts, "The failure rates of concrete poles during Hurricane Wilma are relatively high with breakages caused by falling trees and wind only."

Is your understanding that the failure rates of concrete poles during Hurricane William related more to the concrete poles that were put in for aesthetic reasons as opposed to meeting any extreme wind conditions?

A Yes, sir.

Q And there was no data though in this particular KEMA report that analyzed the strength of the concrete poles or the pole lines being either

Grade B or extreme wind. Is that right?

A We did not do that, no.

Q And you don't know whether KEMA made that conclusion either -- is that right -- as to whether or not the particular concrete pole was built to a different standard?

A No, I do not.

Q All right. And I think Mr. O'Roark had talked to you about the findings on Page 77. And I would like to go over to Page 78, if we could.

A Okay.

Q There's a suspicion that's mentioned near the top that says, "Some CCA type poles might be more brittle." Do you see that?

A Yes, I do.

Q Is that something that you were aware of or thought might be a possibility?

A Now, CCA poles, once you get above a pole larger than a 60- or a 65-foot pole, you do have some problem with the brittleness, but the shorter poles do not exhibit those problems.

Q And for distribution, they're mostly well under 60 feet, aren't they?

A Yes, sir.

Q And here, I believe in the Table 7-17,

there's a comparison of the maximum winds at 115 and 121. Do you know why those two particular wind speeds were picked?

A Not offhand. I can default to, I think, the data that KEMA obtained just came in different blocks, and those happened to be the break points.

Q Does that show, at least for Hurricane Wilma, that there really was no difference in the percentage for the poles that came down for laterals -- in fact, actually a decrease in the number of lateral poles at the higher wind speeds?

A Very minor, yes.

Q And then for feeder poles, there was, I guess, a slight increase in the percentage. Is that right?

A Yes, sir.

Q And also the presence of deterioration was about the same?

A Same for what?

Q I'm sorry. For both wind speeds for the poles that came down?

MR. BUTLER: Laterals or for feeders? Are you asking about both?

MR. SEIVER: Yes, I'm comparing lateral to lateral and feeder to feeder.

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A Okay. Well, at the wind speeds at 115, if I'm looking at it correctly, the presence of deterioration or laterals was 33 and for laterals at 121 was 15.

BY MR. SEIVER:

Q I was looking at the percentage. I'm sorry.

A Oh, okay. 46 to 50, yes, sir.

Q And then 8 percent to 7 for the feeders?

A Yes.

Q So I'm just trying to understand that -- and maybe I missed this, and you can help me out -- because I see under it they speak that wind speed does not correlate with increased contribution of deterioration for lateral or feeder poles. Do you see that?

A That's in the last paragraph there?

Q Well, it's right under the table as far as the Katrina table. It says, "From this data, it becomes obvious" --

A Right.

Q I'm just trying to determine you were looking to see if deterioration really made a difference -- is that it -- as you got to the higher wind speeds?

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A I'm assuming that's what KEMA was doing.
Q And do you agree with that conclusion that the higher wind speed doesn't bring out the worst in deteriorated poles?
A In looking over the data, looking at the percentage, as you mentioned, it appears fairly constant.
Q There's also in this particular section a statement that says there was -- they talk about increased wind speed does correlate with increased contribution of wind as cause for feeder poles and not for lateral poles. Do you see that? That's the third line down where it starts out with "However" --
A "However, an increase in speed does correlate" -- okay.
Q And the next sentence says, "This may be caused by the predominant CCA type of poles in the feeder circuits," which I think you had said you thought were stronger than the creosote and also more recent vintage. Is that right?
A No. Again, I can't go back to a stronger pole. Either pole would have been designed with the same strength requirement.
Q All right. Well, I guess even though the

predominance of CCA really should have no impact then. Is that right?
A That's correct.
Q But it also says, "And the fact that lateral circuits are more shielded resulted in a higher impact of trees as a contributing factor."

Do you see that?

A Yes, sir.

Q Does that also counsel against strengthening lateral poles that are close to trees?

A Well, again, this particular damage that Wilma saw was in the rear lot line, and predominance of trees back there is much higher than in the front lot line that we're building to right now. And what shielding effects we can take for wind we haven't determined yet; we're still looking into that. And, again, we're focusing on the feeder poles as we move forward in this first phase of the hardening. So that seems to be the thrust of where we're going. And we haven't really been able to determine any shielding effect. When we get to that point, then we'll take that into consideration.

Q Going forward with the hardening of the feeder poles, do you expect that those will mostly be concrete poles?

A No, sir.

Q They will be a, I guess -- I don't want to say higher class -- a lower class number but a stronger wood pole?

A They will be a -- you're absolutely right, a stronger wood pole, yes, sir. Well, it's going to be a mixture. It depends on, again, going back to -- it would be nice to have a pure design that we could apply, but the real-world characteristics come into play that affect the span lengths that we can and cannot get and also expect

-- affects our ability to use other techniques such as guying that we will use whatever is the most economical method going forward to harden.

Q You mean storm guying?

A Yes, sir.

Q The last sentence on Page 78, if you could explain to me what this means. It says, "This tells us that a different pole type as an alternative engineering solution is not to be recommended, and the brittleness of CCA poles, if any, is not a decisive factor." What did you take from the non-recommendation of changing pole types?

A I think that entire sentence refers to the CCA treatment, and back to the paragraph you

pointed out to me earlier, that CCA poles are somehow more brittle. I think that is just referring to the -- when they say "pole type," my take on that is the treatment of the poles defining the pole type, not necessarily the class or the size of the pole.

Q And just moving for a second back to your rebuttal testimony, I just want to make sure. On Page 16 at Line 16, you talk about the shielding effects. Remember, we had been talking about that before. You want to see the shielding effects in your investigation be documented in accordance with the NESC guidelines. Is that right?

A Yes, sir.

Q So unless and until that point, though, you think that will Florida Power & Light concentrate its hardening activities on feeder poles

that are not close to tree lines?

A I can't say that as a statement of fact. I'm not familiar with exactly our plans moving forward in that area, no.

Q Have you looked at Mr. Harrelson's presentation or exhibits showing the construction at Lake City, the hardening project at Lake City?

A No, I have not seen that.

Q If you go on to Page 18 of your testimony --

A Okay.

Q -- you're discussing Mr. Harrelson. And thank you for saying he's correct in his statements in Lines 3 and 4. You also say in Line 6 that while FPL is concerned with the storm resilience of all its distribution poles, it is especially important to harden the feeder poles because a feeder failure affects many more customers than a lateral failure.

Is it fair to say then that your hardening projects probably will be concentrated on feeders then as opposed to laterals?

MR. BUTLER: I'm sorry. Mr. Seiver, would you point out to Mr. McEvoy what page and line number you're on?

MR. SEIVER: I'm sorry. I thought I said on Page 18, Line 6.

MR. BUTLER: You may have, but I think he got a little bit confused with it.

MR. SEIVER: I'm sorry. I'm just trying to move things along so we can be done soon.

Hearing Exhibit - 000797

THE WITNESS: I must have something different.

MR. BUTLER: Here.

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THE WITNESS: Okay. I've got the right one now.

MR. SEIVER: Okay. Great.

BY MR. SEIVER:

Q Looking there, you mention that FPL is concerned with storm resilience of all its poles. It's especially important, you say, to harden the feeder poles. And this is just further on what I had been talking about before, is that your expectation, that that will be the focus as opposed to lateral poles for hardening?

A Yes, sir, that is our focus now.

Q Do you know what percentage of the poles in the service area are feeder compared to lateral?

A Existing?

Q Yes, existing.

A I don't know for sure what percentage, no.

Q I mean, do you have an estimate? I don't want you to speculate, but would it be half, more than half are feeder, less than half are feeder?

A No, I would speculate less than half are feeder. More lateral than feeder.

Q Do you think it might be 75/25 lateral to feeder?

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A Oh, no.

Q Not quite that much out of whack?

A I don't think so.

MR. BUTLER: I'm going to object to the characterization of "out of whack."

MR. SEIVER: I'm sorry. I didn't mean it that way. I meant that the percentages diverged more from 50/50. So you can ignore my "out of whack" comment.

MR. BUTLER: Duly ignored.

BY MR. SEIVER:

Q Mr. McEvoy, looking on to Page 19 of your rebuttal testimony, you have a comment here on Mr. Harrelson's quote from Page 78, which was in an analysis -- or not in the conclusion. Do you still have an understanding as to what KEMA meant not on Page 80 but on Page 78 when it said that the wind was the predominant root cause of pole breakage in general and tree breakage causing pole breakage in particular, what they meant by that? And if you want to look at Page 78 of the report, you know, please feel free.

A One of the -- early on in categorizing the various categories that you could put pole failures into, when you look at any kind of failure

data, you're trying to strive for a root cause analysis. And when you looked at why did poles fail during a hurricane, the root cause for every type failure is wind. Wind causes everything. So you can have wind with a contributing factor of wind breaks tree and tree goes into pole. Or you can have wind as -- and a contributing factor that wind

tears out an awning and awning goes into pole.

So rather than continually saying wind was a contributing factor, we early on decided that we would use in effect the contributing factor as the cause with the understanding that without the wind, none of this would have happened.

Q The trees don't just walk into the poles and knock them over on their own?

A Correct. So --

Q I guess a tool shed doesn't go up and hit a pole on its own either?

A No, sir.

Q In that case, though, then does it become -- and we've talked about this a little bit with Mr. O'Roark -- a judgment call in looking at, obviously after the fact, damage as to whether or not there was a contributing factor versus a wind-only factor?

MR. BUTLER: I'm not sure that Mr. McEvoy was finished answering the question before. If he was, fine.

MR. SEIVER: I'm sorry.

MR. BUTLER: But he was still talking when you started talking.

MR. SEIVER: I'm sorry. I guess my phone must have -- it sounded like he had finished. I'm sorry, Mr. McEvoy. If you have some more to add to the other answer, please go ahead.

A Well, I was just going to come to the conclusion on why we ended up with a category called

"Wind Only." And we had to do that to differentiate a category which simply said "Wind" when wind was the cause of everything. So that's how the term "Wind Only" was born.

BY MR. SEIVER:

Q All right. And do you remember my follow-up question?

A Let me continue on here a little bit.

Q Oh, I'm sorry.

A But going back to that sentence that you were talking about, "Wind was the predominant root cause of pole breakage in general and tree breaking

causing pole breakage in particular" --

Q Yes.

A -- I think the way I better understand that statement, if I insert the word "wind" in there, if I say, "Wind was the predominant root cause of pole breakage in general and wind causing tree breakage causing pole breakage in general," it gives me a much better understanding of that sentence.

Q You mean "in particular"?

A In particular. I'm sorry. Yes.

Q All right. And to your recollection -- I think this might have also been covered -- Wilma was a pretty unique storm in your service area. Is that right?

A I don't consider it a unique storm, no, sir.

Q Isn't it the only storm that ever covered

the entire service area?

A I have no knowledge to that.

MR. SEIVER: Well, Mr. Butler, did you -- were you able to find those pages I mentioned to you from Ms. Williams' testimony?

MR. BUTLER: Page 403?

MR. SEIVER: Yeah.

MR. BUTLER: I had asked for it. I'm pretty sure it's there. Let's do this: Let's take a one-minute break, and let me go out to my assistant's desk and see if we've got it yet.

MR. SEIVER: Well, could you also get her direct testimony? It starts at FPL 421 and runs to -- let me see -- it looks like 467.

MR. BUTLER: Okay.

MR. SEIVER: If you could get that, too, I just have one question in that testimony.

MR. BUTLER: Okay. The problem is, you know, we don't have here conveniently accessible to us a set of these documents. They're up in the Tallahassee office.

MR. SEIVER: I'm sorry.

MR. BUTLER: So that one page, I think we already have it. It's going to be a little bit more of a challenge unless we happen to have the testimony in our files for other reasons to get the pages that --

MR. SEIVER: Well, do you want me to

just give you the specific page I'm going to

ask about? I mean, that's going to clue you in to my question, but I'll do that if it will make things go faster.

MR. BUTLER: Well, it probably will make it -- if you want to give me a couple of pages so I'm not entirely clued in, that's fine.

MR. SEIVER: Well, can I just mix them up and give you very -- not even consecutive?

MR. BUTLER: Sure.

MR. SEIVER: I'm joking.

MR. BUTLER: Sure.

MR. SEIVER: Page 442 is the document Bates number. Page 22 of Ms. Williams' testimony of January 13th.

MR. BUTLER: Okay. We have the 403 here. I'm going to ask -- hold on just one second. I'm just going to ask the assistant to get 442 as well.

MR. SEIVER: Thank you.

MR. BUTLER: Okay. Mr. Seiver, we have Page 15, the Bates No. 403, and we're in the process of getting 442.

MR. SEIVER: Excellent. Do you want to just wait until you have them both? Because as soon as I ask on both of those, I only

have, I think, two more questions after that and we'd be done.

MR. BUTLER: Okay. Maybe that makes the

most sense. Let's see what we can do about getting those quickly.

MR. SEIVER: Okay. I'll just go back on hold. Thank you.

(Recess from 4:09 p.m. to 4:13 p.m.)

MR. BUTLER: Okay. We have both pages now, and we are ready.

BY MR. SEIVER:

Q All right. I believe when I got sidetracked by Mr. Butler -- no, I'm kidding.

Mr. McEvoy, if you look at Page 15 of Ms. Williams' rebuttal testimony, which is the FPL Bates stamped Document No. 403 -- do you see that --

A Yes, sir.

Q -- I had been asking you about the vegetation-related contours of FPL service territory. Would you look at Line 19.

A Okay.

Q Do you see it says, "Tree density (trees per mile) in FPL service territory is twice the national average"? Do you see that?

A Yes, sir.

Q You weren't aware of that before today?

A If I was aware of it, I don't recollect it.

Q The next sentence, it says, "Additionally, Florida's climate and twelve-month growing season results in some of the highest tree regrowth rates in the nation." Do you see that?

A Yes, I do.

Q Were you aware of that before today?

A I was aware our trees grow fast, yes.
Q Do you have any understanding or knowledge of the height of trees in the service area?
A No.
Q Nothing like an average height or anything else like that?
A No, I do not.
Q If you would turn to the direct testimony, the page that I asked, which is Page 22 of Ms. Williams' direct testimony, FPL Bates Stamp No. 442. Do you have that?
A Yes, sir.
Q And I was looking at the area of her answer beginning on Line 9 where it says, "While every storm is different, Wilma was unique in one

very significant aspect in contrast to prior storms: Wilma affected our entire infrastructure in ways never before experienced." Do you see that?
A Yes, sir.
Q Do you agree with Ms. Williams?
A I think the following -- as I'm reading this, the following sentence probably explains what she intended by saying, "Power plants, transmission lines and substations as well as distribution facilities all suffered damage." And I think -- although I wasn't a part of putting this together, I think what she's referring to, it affected power plants, transmission lines and substations differently than ever had been affected before.

Hearing Exhibit - 000805

Q And isn't it true that the wind speed in Wilma was higher than any other hurricane that affected your service territory in recent years?

A I can recall participating in Hurricane Andrew, and it was much more -- much more severe than Wilma.

Q And what year was Andrew?

A '92, I believe.

Q Mr. McEvoy, have you or, to your knowledge, has anyone within Florida Power & Light made a meteorological prediction or assessment that

a Wilma type storm may hit FPL service territory again?

A I think, based on our past history, our expectations of an average of approximately once every five years during normal hurricane activity.

Q Does that particular prediction have an impact on the design and storm hardening activities?

A Not to my knowledge.

Q If a storm was predicted not to come for another ten years, would that be something relevant to consider in your storm hardening activities?

A I think, again, we're basing it on the National Electric Safety Code Basic Wind Speed Map and we're designing for the criteria as laid out in that document.

Q Did Florida Power & Light's plant perform well in Hurricane Katrina?

A It performed as expected.

Q And in any of the other storms from 1992 until Wilma, were there any substantial problems

with the plant that you're aware of?

A When you mention the word "plant," you're talking about distribution facilities?

Q Yes, distribution facilities.

A I think based on -- in fact, KEMA has a

recap of that on Page 4 of their report that if you look at the different strengths of the various hurricanes and the percent of pole failure, that the distribution system basically performed as would be expected, based on past performance.

Q And if you go to -- if you would now look over to Page 80 of the KEMA report.

A Okay. I'm on Page 80.

Q The last paragraph, it says, "During Hurricane Wilma, the pole breakage was below 1.5 percent of the total amount of poles exposed to hurricane wind speeds. This pole performance is consistent with FPL pole performance during other hurricanes; only Hurricane Andrew and Hurricane Charlie had higher ratios relative to their higher wind speeds."

I'm trying to understand, Mr. McEvoy, Wilma then, at least as far as KEMA is saying, is not an unusual storm as far as the impact on the distribution -- or on the poles that were exposed to hurricane wind speeds. Isn't that right?

A Yes, sir.

Q But isn't FP&L going to extreme wind on the basis of the results of Hurricane Wilma?

A We're going to extreme wind based on the

fact that forensics for Hurricane Wilma has showed to us that our facilities will fail due to wind only. And proceeding forward, if we're going to move the bar, meaning we're going to have better performance out of our distribution system when it is struck by a hurricane, we've got to change what we're doing, and designing to extreme wind will help that along.

Q But if the pole breakage was consistent during Wilma with other hurricanes, why do you have to change anything?

A We want it to be better than it was with other hurricanes. We're not satisfied with consistent, nor do we feel our customers are.

Q And at least as far as you see the storm hardening activities of somewhat like a doctor, you know, do no harm, you don't want to harden facilities that will then become more expensive or more difficult to restore. Isn't that right?

A Could you phrase that a little differently? I didn't follow it.

Q One of the unintended -- or one of the consequences of hardening is that when poles are damaged, they are occasionally longer to restore -- it takes longer to restore and perhaps may leave

outages for a longer period of time. Isn't that right?

A We don't feel that the damages will be worse. In fact, they'll be less, and our ability to restore should be equal. We have -- we are

Hearing Exhibit - 000808

purchasing new equipment that allows us to deal with this. We have stockpiles of poles, both wood and concrete. We have cranes available, if necessary, in all of our service areas. And this will in no way slow down our restoration effort.

Q Do you know how long the restoration effort was after Hurricane Wilma?

A I believe it was 16 or 17 days, but I'm not for sure on that.

Q Do you know how long it took you to get all the data that you used for Hurricane Wilma, I mean for the KEMA report?

A We were performing forensics up until the restoration was complete.

Q So the same 16 or 17 days?

A Yes, sir.

Q Is that restoration period similar to the restoration periods from the other hurricanes?

A I don't have any knowledge of that.

Q So you don't know whether the outages

were any longer?

A No, sir.

Q If you look on to Page 85 of the KEMA report --

A Yes, sir.

Q -- I presume you've already answered this, but in the middle paragraph, "Distribution Performance" --

A Right.

Q -- the first sentence says, "FPL pole

Hearing Exhibit - 000809

performance during non-hurricane conditions is good." The second sentence says, "Distribution pole performance during Wilma is known to be acceptable." And I'm leaving out the rest of that sentence, but I trust from what you've said before, acceptable isn't good enough. Is that right?

A I think the term "acceptable" as they're using it there refers to it's consistent with past pole performance.

Q Which is what we talked about on the earlier page?

A Yes, sir.

Q Are there any other consequences of pole hardening, such as increased auto accidents or severity of auto accidents because there are either

more poles or stronger poles, that come into consideration in the storm hardening initiative?

MR. BUTLER: I'll object to the form of the question.

Q Do you understand what I'm asking, Mr. McEvoy?

A I'm not aware of any data or any studies in that area.

Q You're not aware of any analysis of the number of pole claims that currently exist with the existing distribution plant that show car accidents or other vehicular accidents with the pole plant?

A No, sir.

MR. SEIVER: All right. That's all I have. Thank you very much, Mr. McEvoy.

MR. BUTLER: I may have a couple on

redirect. Let me just look at my notes here for a second.

MR. SEIVER: You want to just go on mute for a few minutes?

MR. BUTLER: Yeah, just a couple of minutes. Thanks.

(Recess from 4:24 p.m. to 4:25 p.m.)

EXAMINATION

BY MR. BUTLER:

Q Mr. McEvoy, would you turn to Page 62 of the KEMA report.

A Yes, sir, I'm there.

Q You were asked some questions comparing pole failures in Hurricane Wilma and Hurricane Katrina by both Mr. O'Roark and Mr. Seiver. Do you recall that?

A Yes, sir.

Q I'd like you to direct your attention to Table 7-11 that's shown here on Page 62. And does this show the pole breakages in Katrina and then in Wilma as a percentage of the total FPL pole population?

A Yes, sir.

Q And what is the percentage of FPL's total poles that broke in Hurricane Katrina?

A That would be on the bottom right of that particular matrix, 1.46 percent.

Q I'm sorry. I asked about Hurricane Katrina.

A Oh, I'm sorry. That would be .14

Hearing Exhibit - 000811

percent.

Q And then for Hurricane Wilma, it's what?

A 1.46.

Q How much larger would you say the 1.46 is

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than the .14?

A It appears to be about five or six times larger. Or -- well, no, it would be more like almost ten percent larger -- or -- I'm sorry -- ten times larger.

Q Would you look at the column that is tree -- Pole Failures as a Result of Tree Impacts.

A Yes.

Q The column for Wilma shows what percentage of FPL's total pole population failed because of tree impacts?

A .31 percent.

Q And for Hurricane Katrina, that would be?

A .08 percent.

Q Does that show that of the total number of poles, that more or less poles failed due to tree impacts in Hurricane Wilma?

MR. SEIVER: Can I just object? I know this is technically cross, but you're leading your own witness pretty heavily there, John.

MR. BUTLER: I'm trying not to. I just asked him if it was more or less, and I'm just pointing him to the column.

MR. SEIVER: Well, all right.

MR. BUTLER: I don't think it's leading.

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I will try to avoid doing so.

BY MR. BUTLER:

Q Mr. McEvoy, would you look at the column, please, on Wind Only Pole Failures.

A Yes, sir.

Q What is the percentage of Wind Only Pole Failures for Hurricane Wilma?

A It's .31 percent.

Q I'm sorry. Wind only?

A I'm sorry. Wind only is .75 percent.

Q And what is it for wind only on Katrina?

A Zero percent.

Q How would you characterize the percentage of total pole failures in Hurricane Wilma caused by trees as compared to wind only? Is the tree percentage higher or lower than the wind only percentage?

A For Wilma, the tree percentage is lower than the wind only, about half, a little less than half as much.

Q And how would you characterize that same comparison of the tree damage percentage to the wind only damage percentage for Hurricane Katrina?

A Since there was basically zero percent wind only, a much larger percentage -- even though

it's .08 percent, it's larger than wind only, quite a bit.

MR. BUTLER: Thank you. That's all the questions that I have.

MR. SEIVER: I have no further cross.

MR. O'ROARK: Nor do I.

Hearing Exhibit - 000813

MR. YOUNG: Staff has no questions.

MR. BUTLER: Okay. We don't waive reading and signing.

(At 4:31 p.m., no further questions were propounded to the witness.)

CERTIFICATE OF REPORTER

STATE OF FLORIDA:
COUNTY OF HILLSBOROUGH:

I, Karen Kay Skeen, Notary Public in and for the State of Florida at Large, do hereby certify that I reported in shorthand the foregoing proceedings at the time and place therein designated; that the witness herein was duly sworn by me; that my shorthand notes were thereafter reduced to typewriting under my supervision; and that the foregoing pages are a true and correct, verbatim record of the aforesaid proceedings.

Witness my hand and seal September 26, 2007, in the City of Tampa, County of Hillsborough, State of Florida.

Karen Kay Skeen
Notary Public
State of Florida at Large

SIGNATURE PAGE/ERRATA SHEET

Hearing Exhibit - 000814

WITNESS: JOHN MCEVOY
RE: REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN

INSTRUCTIONS TO WITNESS

Please note any errors or amendments on this page, indicating the reason for any change you wish to make. Do not mark on the transcript itself. Please sign and date this sheet as indicated below. If additional lines are required for corrections, attach additional sheets.

PAGE	LINE	ERROR OR AMENDMENT/REASON FOR CHANGE
7	24	CHANGE 4 COUNTIES TO SIX / CORRECT NUMBER OF COUNTIES
7	25	ADD COLLIER AND LEE COUNTIES AFTER MONROE / ADD COUNTIES
22	21	CHANGE GRADE B TO GRADE C / INCORRECTLY STATED GRADE B
22	25	CHANGE 94 TO 93 / INCORRECTLY STATED 94
48	5	CHANGE 3-G TO III-G / CORRECT NOTATION FOR CONCRETE POLE
48	8	CHANGE II TO 2 AND III TO 3 / CORRECT NOTATION FOR WOOD POLES
48	11	CHANGE 3-G TO III-G / CORRECT NOTATION FOR CONCRETE POLE
48	14	CHANGE 3H TO III-H / CORRECT NOTATION FOR CONCRETE POLE
48	20	CHANGE 3-G TO III-G / CORRECT NOTATION FOR CONCRETE POLE
51	3	CHANGE III TO 3 / CORRECT NOTATION FOR WOOD POLE
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I have read my transcript and subscribe to its accuracy, to include the corrections or amendments noted above or hereto attached.

John McEvoy 9-28-07

Signature of Witness Dated

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EXHIBIT NO. _____

DOCKET NO: 070297-EI – TAMPA ELECTRIC COMPANY,
070298-EI- PROGRESS ENERGY FLORIDA, INC.,
070299-EI – GULF POWER COMPANY,
070301-EI – FLORIDA POWER & LIGHT COMPANY

WITNESS: VARIOUS

DESCRIPTION: STAFF'S COMPOSITE EXHIBITS - 6

DOCUMENTS:

1) AT&T's Response to Staff's First Set of Interrogatories (Nos. 1-8) (all dockets)
2) Embarq's Response to Staff's First Set of Interrogatories (Nos. 1-8) (all dockets)
3) FCTA's Response to Staff's First Set of Interrogatories (Nos. 1-8) (all dockets)
4) Deposition Transcript of Mickey Harrelson (all dockets) (including errata sheet)

PROFFERED BY: STAFF

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070297, 070298, 070299 & 070301-EI EXHIBIT 6
COMPANY FL PSC Staff
WITNESS Staff's Composite Exhibit-6 Stipulated
DATE 10/02-03/07

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, FAC, submitted by Tampa Electric Company	)	Docket No. 070297-EI
Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, FAC, submitted by Progress Energy Florida, Inc.	)	Docket No. 070298-EI
Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, FAC, submitted by Gulf Power Company	)	Docket No. 070299-EI
Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, FAC, submitted by Florida Power & Light Company	)	Docket No. 070301-EI
	)	Filed: September 25, 2007

AT&T FLORIDA'S RESPONSES AND OBJECTIONS TO STAFF'S FIRST SET OF INTERROGATORIES

BellSouth Telecommunications, Inc. d/b/a AT&T Florida ("AT&T Florida"), pursuant to Rule 28-106.206, Florida Administrative Code, Rules 1.340 and 1.280, Florida Rules of Civil Procedure, and Florida Public Service Commission Order No. PSC-07-0573-PCO-EI Establishing Procedure, hereby files the following Responses and Objections to the Staff of the Florida Public Service Commission's ("Staff's") First Set of Interrogatories (Nos. 1-8), dated September 5, 2007 ("the Discovery").

AT&T Florida reiterates and incorporates its General and Specific Objections filed on September 19, 2007.

GENERAL OBJECTIONS

1. AT&T Florida objects to the Discovery to the extent it seeks to impose an obligation on AT&T Florida to respond on behalf of subsidiaries, affiliates, or other persons that are not parties to this case on the grounds that such discovery is overly broad, unduly burdensome, oppressive, and not permitted by applicable discovery rules.

2. AT&T Florida objects to the Discovery to the extent it is intended to apply to matters other than those subject to the jurisdiction of the Commission. AT&T Florida objects to such requests as being irrelevant, overly broad, unduly burdensome, and oppressive.

3. AT&T Florida objects to each and every Discovery request and instruction to the extent that such request or instruction calls for information that is exempt from discovery by virtue of the attorney-client privilege, work product privilege, or other applicable privilege.

4. AT&T Florida objects to each and every Discovery request insofar as the requests are vague, ambiguous, overly broad, imprecise, or utilizes terms that are subject to multiple interpretations but are not properly defined or explained for purposes of these data requests. Any answers provided by AT&T Florida in response to the requests will be provided subject to, and without waiver of, the foregoing objection.

5. AT&T Florida objects to each and every Discovery request insofar as they are not reasonably calculated to lead to the discovery of admissible evidence and are not relevant to the subject matter of this action.

6. AT&T Florida objects to providing information to the extent that such information is already in the public record before the Commission or already in the possession of Staff.

7. AT&T Florida objects to the Discovery requests, instructions and definitions, insofar as they seek to impose obligations on AT&T Florida that exceed the requirements of the Florida Rules of Civil Procedure or Florida law.

8. AT&T Florida objects to each and every Discovery request that is unduly burdensome, expensive, oppressive, or excessively time consuming as written.

9. AT&T Florida is a large corporation with employees located in many different locations in Florida and in other states. In the course of its business, AT&T Florida creates countless documents that are not subject to Commission or FCC retention of records requirements. These documents are kept in numerous locations that are frequently moved from site to site as employees change jobs or as the business is reorganized. Therefore, it is possible that not every document has been identified in response to these requests. AT&T Florida will conduct a search of those files that are reasonably expected to contain the requested information. To the extent that the requests purport to require more, AT&T Florida objects on the grounds that compliance would impose an undue burden or expense.

10. AT&T Florida objects to each and every Discovery request to the extent that the information requested constitutes "trade secrets" pursuant to Florida Statutes. To the extent that Staff requests proprietary confidential business information, AT&T Florida will make such information available under a

Request for Specified Confidential Classification, subject to any other general or specific objections contained herein.

11. AT&T Florida objects to any Discovery request that seeks to obtain "all" of particular documents, items, or information to the extent that such requests are overly broad and unduly burdensome. Any answers provided by AT&T Florida in response to this discovery will be provided subject to, and without waiver of, the foregoing objection.

RESPONSES

REQUEST: What is the revised estimate of AT&T Florida's cost and benefit information associated with the Storm Hardening Plans for each of the IOUs that reflect the impact of any supplements to the original hardening plans or information obtained through negotiations or discussions with each IOU.

SPECIFIC OBJECTION:

Objection, this interrogatory requests information that is irrelevant as AT&T Florida is not objecting to any of the Storm Hardening Plans being considered in this proceeding at this time, based on AT&T Florida's review of the detailed project information provided by the IOUs to date and with the understanding that the parties support using the Process to Engage Third-Party Attachers attached to Kirk Smith's Direct Testimony as Exhibit KS-1 (with one suggested revision by Staff) on a going forward basis. Without waiving the foregoing objections, AT&T Florida provides the following responses for each proposed Storm Hardening Plan.

RESPONSE:

Revised Estimates:

FPL: Based on a review of FPL's Storm Hardening Plan and the documents that FPL has provided to date, AT&T Florida estimates that it will incur approximately $3,792,500 in costs in connection with FPL's proposed 2007 storm hardening projects (both critical infrastructure and incremental hardening projects). This estimate would be subject to change as AT&T Florida actually engineers the jobs for the work it will need to perform in connection with the proposed projects. AT&T Florida has not developed an estimate for 2008 and 2009 as FPL has provided only high level information on proposed projects for those years. AT&T Florida expects that its analysis of those projects will be accomplished through the Process to Engage Third-Party Attachers stipulated to by the parties.

Gulf Power: Based on its review of Gulf Power's amended Storm Hardening Plan filed on August 14, 2007 and project details provided by Gulf Power to date, AT&T Florida estimates its costs associated with Gulf Power's 2007 – 2009

proposed storm hardening projects to be as follows: 2007 - $345,000; 2008 - $339,000, and; 2009 - $352,500. These estimates would be subject to change as AT&T Florida actually engineers the jobs for the work it will need to perform in connection with the proposed projects. Additionally, AT&T Florida will be able to perform a more comprehensive analysis of potential costs as it receives more detailed information from Gulf Power through the Process to Engage Third-Party Attachers stipulated to by the parties.

Progress Energy: Based on its review of Progress Energy's Supplement to its Storm Hardening Plan dated August 7, 2007, AT&T Florida is only impacted by one of Progress Energy's proposed storm hardening projects and anticipates incurring approximately $2,000 in costs associated with that project.

TECO: AT&T Florida does not anticipate incurring costs in connection with TECO's proposed storm hardening projects because, as of this date, AT&T Florida does not have attachments on TECO's poles.

Updated Benefit Information: AT&T Florida does not have updated benefit information. As previously stated in its initial comments to the IOUs' proposed Storm Hardening Plans, the most significant benefit AT&T Florida may recognize from implementation of the proposed Plans would be from the potential reduction of commercial power outages following severe weather events. As a customer of the IOUs, AT&T Florida relies on electric service to power its remote terminals. AT&T Florida cannot quantify this potential benefit as it does not know how many remote terminals are served by the circuits that will be hardened. Further, through AT&T Florida's placement of permanent generators at large remote terminal sites and the expansion of its portable generator inventory, AT&T Florida has taken steps to minimize its reliance on commercial power following a storm.

RESPONSE PROVIDED BY: Kirk Smith

REQUEST: In response to Staff's first set of interrogatories, FPL stated that it intends to replace 2000 poles in 2007. What is AT&T Florida's total estimated transfer cost associated with these poles assuming AT&T Florid was attached to each pole being replaced?

a. Please provide a detailed analysis of AT&T Florida's total estimated transfer cost stated in Staff's Interrogatory No. 2.

b. Assuming FPL replaces the same number of poles in 2008 and 2009 as they project for 2007, what are AT&T Florida's total estimated transfer costs for 2008 and 2009?

SPECIFIC OBJECTION:

Objection, this interrogatory requests information that is irrelevant as AT&T Florida is not objecting to FPL's Storm Hardening Plan at this time, based on AT&T Florida's review of the detailed project information provided by FPL to date and with the understanding that the parties support using the Process to Engage Third-Party Attachers attached to Kirk Smith's Direct Testimony as Exhibit KS-1 (with one suggested revision by Staff) on a going forward basis. Without waiving the foregoing objections, AT&T Florida provides the following response.

RESPONSE:

Assuming that AT&T Florida was on each of the 2000 poles replaced, it would estimate its transfer costs to be approximately $2,050,000 for 2007.

a. This estimate is based on an assumption that 85% of the transfers would cost approximately $500 per pole and that 15% of the transfers would involve some cable splicing or replacement work costing approximately $4,000 per pole.

b. Assuming FPL replaced the same number of poles in 2008 and 2009 and that AT&T Florida was attached to each pole being replaced, AT&T Florida would estimate transfer costs to be $2,050,000 per year, using the formula set forth in (a) above.

RESPONSE PROVIDED BY: Kirk Smith

REQUEST: In response to Staff first set of interrogatories, Gulf has indicated it will be replacing approximately 650 poles in 2007, 650 in 2008, and 650 in 2009. What is AT&T Florida's total estimated transfer cost associated with these poles assuming AT&T Florida was attached to each pole being replaced.

a. Please provide a detailed analysis of AT&T Florida's total estimated transfer cost stated in Staff's Interrogatory No. 3.

SPECIFIC OBJECTION:

Objection, this interrogatory requests information that is irrelevant as AT&T Florida is not objecting to Gulf's Storm Hardening Plan at this time, based on AT&T Florida's review of the detailed project information provided by Gulf to date and with the understanding that the parties support using the Process to Engage Third-Party Attachers attached to Kirk Smith's Direct Testimony as Exhibit KS-1 (with one suggested revision by Staff) on a going forward basis. Without waiving the foregoing objections, AT&T Florida provides the following response.

RESPONSE:

Assuming that AT&T Florida was on each of the 650 poles replaced, it would estimate its transfer costs to be approximately $664,500 for 2007.

a. This estimate is based on an assumption that approximately 85% of the transfers would cost approximately $500 per pole and that approximately 15% of the transfers would involve some cable splicing or replacement work costing approximately $4,000 per pole.

RESPONSE PROVIDED BY: Kirk Smith

REQUEST: Staff estimates that PEF may replace approximately 1,375 poles in 2007. What is AT&T Florida's total estimated transfer cost associated with these poles assuming AT&T Florida was attached to each pole being replaced?

a. Please provide a detailed analysis of AT&T Florida's total estimated transfer cost stated in Staff's Interrogatory No. 4.

b. Assuming PEF replaces the same number of poles in 2008 and 2009 as staff projected PEF may replace for 2007, what are AT&T Florida's total estimated transfer costs for 2008 and 2009?

SPECIFIC OBJECTION:

Objection, this interrogatory requests information that is irrelevant as AT&T Florida is not objecting to PEF's Storm Hardening Plan at this time, based on AT&T Florida's review of the detailed project information provided by PEF to date and with the understanding that the parties support using the Process to Engage Third-Party Attachers attached to Kirk Smith's Direct Testimony as Exhibit KS-1 (with one suggested revision by Staff) on a going forward basis. Without waiving the foregoing objections, AT&T Florida provides the following response.

RESPONSE:

Assuming that AT&T Florida was on each of the 1,375 poles replaced, it would estimate its transfer costs to be approximately $1,408,500 for 2007.

a. This estimate is based on an assumption that 85% of the transfers would cost approximately $500 per pole and that 15% of the transfers would involve some cable splicing or replacement work costing approximately $4,000 per pole. [Please note that, as stated in AT&T Florida's response to Interrogatory No. 1, AT&T Florida's facilities are only impacted by one of Progress Energy's proposed hardening projects for 2007 – 2009 so AT&T Florida does not expect to incur the costs derived from this hypothetical.]

b. Assuming Progress Energy replaced the same number of poles in 2008 and 2009 and that AT&T Florida was attached to each pole being replaced, AT&T Florida would estimate transfer costs to be $1,408,500 per year, using the formula set forth in (a) above.

RESPONSE PROVIDED BY: Kirk Smith

REQUEST: In response to Staff first set of interrogatories, TECO has indicated that it will be replacing a total of 835 poles in 2007-2009. What is AT&T Florida's total estimated transfer cost associated with these poles assuming AT&T Florida was attached to each pole being replaced?

a. Please provide a detailed analysis of AT&T Florida's total estimated transfer cost stated in Staff's Interrogatory No. 5.

SPECIFIC OBJECTION:

Objection, this interrogatory requests information that is irrelevant as AT&T Florida is not objecting to TECO's Storm Hardening Plan at this time, based on AT&T Florida's review of the detailed project information provided by TECO to date and with the understanding that the parties support using the Process to Engage Third-Party Attachers attached to Kirk Smith's Direct Testimony as Exhibit KS-1 (with one suggested revision by Staff) on a going forward basis. Without waiving the foregoing objections, AT&T Florida provides the following response.

RESPONSE: At the current time, AT&T Florida does not have attachments on TECO's poles so AT&T Florida would not incur costs in connection with TECO's proposed pole replacements.

RESPONSE PROVIDED BY: Kirk Smith

REQUEST: What other cost elements may AT&T Florida incur in storm hardening efforts other than the pole transfer costs for each IOU?

SPECIFIC OBJECTION:

Objection, this interrogatory requests information that is irrelevant as AT&T Florida is not objecting to any of the Storm Hardening Plans being considered in this proceeding at this time, based on AT&T Florida's review of the detailed project information provided by the IOUs to date and with the understanding that the parties support using the Process to Engage Third-Party Attachers attached to Kirk Smith's Direct Testimony as Exhibit KS-1 (with one suggested revision by Staff) on a going forward basis. Without waiving the foregoing objections, AT&T Florida provides the following response.

RESPONSE:

With regard to FPL, Gulf Power and Progress Energy, AT&T Florida expects that it may eventually face a request for increased pole rental rates to account for the placement of more expensive poles. AT&T Florida anticipates that it will also incur costs related to assuming ownership of poles vacated by IOUs (e.g., payment for the pole and costs to obtain easements, if necessary).

Additionally, while AT&T Florida does not expect to incur such costs based on the storm hardening project details it has reviewed to date, there is also a potential in the future (depending on the nature and scope of future proposed projects) for incurring costs related to increased workloads prompted by storm hardening activities (e.g., hiring additional employees, paying overtime to existing employees), purchasing new tools for work that needs to be performed on new non-wood poles, and training employees on new construction and attachment procedures.

As stated in response to Interrogatory No. 5, AT&T Florida does not have attachments on TECO's poles and, thus, will not incur costs as a result of TECO's proposed storm hardening activities.

RESPONSE PROVIDED BY: Kirk Smith

REQUEST: What specific additional information, if any, is needed from each IOU that AT&T Florida is attached to in order for AT&T Florida to provide an estimate of cost benefit data for storm hardening projects in 2007, 2008, and 2009?

RESPONSE:

In order to perform a meaningful cost-benefit analysis of a particular storm hardening project, AT&T Florida needs to know which poles will be affected, as well as the type of work the electric utility plans to perform. For example, AT&T Florida needs to know whether the electric utility will replace poles, change from wood poles to poles of another material such as concrete or steel, place poles in locations different from the existing poles, or relocate or underground existing aerial facilities. Once AT&T Florida has this level of detail, it can evaluate how its facilities will be impacted, what work it would need to perform, and if there are potentially more cost-effective ways to harden the infrastructure in question.

Because it may not be feasible for electric utilities to develop this level of detail years, or sometimes even many months in advance of a storm hardening project due to changes in field conditions, changes in service needs, and even changes in internal budgets, AT&T Florida and the IOUs, together with other parties in this proceeding, developed the Process to Engage Third-Party Attachers. The Process to Engage Third-Party Attachers provides for a reasonable timetable for the exchange of information between the IOUs and the third-party attachers. It gives the electric utilities the flexibility to finalize some of their engineering plans closer in time to construction, while giving the attaching entities sufficient time to evaluate specific projects, provide input on them, perform a meaningful cost benefit analysis, and bring concerns before the Florida Public Service Commission if necessary.

RESPONSE PROVIDED BY: Kirk Smith

REQUEST: Is AT&T Florida currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?

a. If your response to Staff Interrogatory No. 8 is Yes, please give examples of the level of information AT&T Florida exchanges using NJUNS.

b. If your response to Staff Interrogatory No. 8 is No, is AT&T Florida planning on using NJUNS in the future for notifying parties of construction activities?

c. If your response to Staff Interrogatory Number 8(b) is Yes, please describe how, when, and with whom will AT&T Florida use NJUNS to exchange information regarding construction activities.

RESPONSE:

Yes.

a. AT&T Florida uses the NJUNS on-line software system to communicate and track information regarding the notification of pole replacements and facility transfer requests. Notifications are delivered via e-mail and each ticket is maintained and recorded in the on-line database. When work is complete and the ticket is updated, the next company listed on the ticket is automatically notified. Once the last transfer is completed, the pole owner is notified electronically so that the pole can be removed. AT&T Florida currently uses the system to coordinate work activity with FPL, Gulf Power and Progress Energy, as well as the third-party attachers who have facilities on the poles in those service territories.

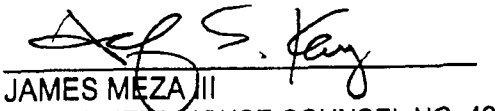
b. Not applicable.

c. Not applicable.

RESPONSE PROVIDED BY: Kirk Smith

Respectfully submitted this 25th day of September, 2007.

AT&T FLORIDA



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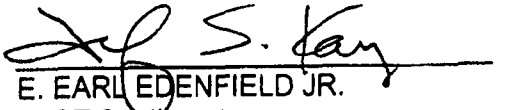

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company.	)	DOCKET NO 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	)	DOCKET NO. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company.	)	DOCKET NO. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company	)	DOCKET NO. 070301-EI FILED: September 14, 2007

NOTICE OF SERVICE OF EMBARQ FLORIDA, INC.'S RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1 -8)

Embarq Florida, Inc., pursuant to Rule 1.340, Florida Rules of Civil Procedure and Rule 28-106.206, F.A.C., hereby gives notice that it has served its Response to Staff's First Set of Interrogatories via electronic and US mail to Keino Young, 2540 Shumard Oak Blvd, Tallahassee, FL 32399, kyoung@psc.state.fl.us.

RESPECTFULLY SUBMITTED this 25th day of September 2007

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Hearing Exhibit - 000833

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company.	DOCKET NO. 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	DOCKET NO.070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company.	DOCKET NO.070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company.	DOCKET NO. 070301-EI DATED: SEPTEMBER 25, 2007

EMBARQ'S RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1 -8)

Pursuant to Rule 28-106.206, Florida Administrative Code, and Rules 1.340, and 1.280(b), Florida Rules of Civil Procedure, by and through undersigned counsel, Embarq Florida, Incorporated (hereinafter "Embarq") hereby submits the following Responses to Staff's First Set of Interrogatories which were served on Embarq on September 5, 2007.

Interrogatory	Prepared by	Title
1-8	Henry Bowlin	Process Specialist II - Engineering

Hearing Exhibit - 000834

INTERROGATORIES

1. **What is the revised estimate of Embarq's cost and benefit information associated with the Storm Hardening Plans for each of the IOUs that reflect the impact of any supplements to the original hardening plans or information obtained through negotiations or discussions with each IOU.**

Response: Total estimated costs for 2007 – 2009:

- Florida Power & Light = $50,000
- Gulf Power = $28,000
- Progress Energy = $450,000
- Tampa Electric = $0

The cost estimates for FP&L and Gulf Power are for transferring Embarq aerial facilities from the old pole to the new hardened pole. The cost estimate for Progress Energy is for transferring Embarq aerial facilities from the old pole to the new hardened pole and under grounding facilities crossing major highways.

2. **In responses to Staff's first set of interrogatories, FPL stated that it intends to replace 2000 poles in 2007. What is Embarq's total estimated transfer cost associated with these poles assuming Embarq was attached to each pole being replaced?**

Response: 2000 Poles X $200 Transfer cost = $400,000

a. **Please provide a detailed analysis of Embarq's total estimated transfer cost stated in Staff's Interrogatory No. 2.**

Response: Estimated cost for each transfer is $200, which includes engineering review and actual labor to perform the transfers.

Hearing Exhibit - 000835

b. **Assuming FPL replaces the same number of poles in 2008 and 2009 as they project for 2007, what are Embarq's total estimated transfer costs for 2008 and 2009?**

Response: 4,000 Poles X $200 Transfer cost = $800,000

It should be noted, based on the information provided by FP&L, Embarq estimates that we are attached to 250 poles to be hardened and that will require Embarq facility transfers for the 2007 thru 2009 plans.

3. **In responses to Staff's first set of interrogatories, Gulf has indicated it will be replacing approximately 650 poles in 2007, 650 in 2008, and 650 in 2009. What is Embarq's total estimated transfer cost associated with these poles assuming Embarq was attached to each pole being replaced?**

Response: 1,950 Poles X $200 Transfer cost = $390,000

It should be noted, based on the information provided by Gulf Power, Embarq estimates that we are attached to 140 poles to be hardened and that will require Embarq facility transfers for the 2007 thru 2009 plans.

a. **Please provide a detailed analysis of Embarq's total estimated transfer cost stated in Staff's Interrogatory No. 3.**

Response: Estimated cost for each transfer is $200, which includes engineering review and actual labor to perform the transfers.

4. **Staff estimates that PEF may replace approximately 1,375 poles in 2007. What is Embarq's total estimated transfer cost associated with these poles assuming Embarq was attached to each pole being replaced?**

Response: 1,375 Poles X $200 Transfer cost = $275,000

a. **Please provide a detailed analysis of Embarq's total estimated transfer cost stated in Staff's Interrogatory No. 4.**

Response: Estimated cost for each transfer is $200, which includes engineering review and actual labor to perform the transfers.

b. **Assuming PEF replaces the same number of poles in 2008 and 2009 as staff projected PEF may replace for 2007, what are Embarq's total estimated transfer costs for 2008 and 2009?**

Response: 2,750 Poles X $200 Transfer cost = $550,000

It should be noted, based on the information provided by PEF, Embarq estimates that we are attached to 350 poles to be hardened and that will require Embarq facility transfers for the 2007 thru 2009 plans. The remainder of Embarq cost impact for PEF is for under grounding facilities and major highway buried crossings.

5. ***In responses to Staff's first set of interrogatories, TECO has indicated that it will be replacing a total of 835 poles in 2007 through 2009. What is Embarq's total estimated transfer cost associated with these poles assuming Embarq was attached to each pole being replaced?***

Response: 2,505 Poles X $200 Transfer cost = $501,000

a. **Please provide a detailed analysis of Embarq's total estimated transfer cost stated in Staff's Interrogatory No. 5.**

Response: Estimated cost for each transfer is $200 each, which includes engineering review and actual labor to perform the transfers.

It should be noted that Tampa Electric has provided information and confirmation that Embarq will not have any aerial transfers or under grounding cost impact for the 2007 thru 2009 plans.

6. **What other cost elements may Embarq incur in storm hardening efforts other than the pole transfer costs for each IOU?**

Response: Embarq may incur additional cost as a result of an IOU's customers (individual citizens and/or city, county and federal governments) requesting and paying for the underground of a section of their aerial facilities and the removal of the poles

Hearing Exhibit - 000837

during 2007 - 2009. Embarq also may incur additional cost in repairs and facility replacement due to the IOU's increased pole line construction activity throughout the state. Finally, the impact of all of the IOU's hardening plans and capital investment for 2007 – 2009 (not just those hardening activities specific to Embarq), may cause Embarq to incur additional cost in pole rent for each of its attachments, under the terms and conditions of Embarq's pole attachment agreements with each IOU. These rates are calculated using a formula that includes a factor using the IOU's total pole plant capital investment.

7. What specific additional information, if any, is needed from each IOU that Embarq is attached to in order for Embarq to provide an estimate of cost benefit data for storm hardening projects in 2007, 2008, and 2009?

Response: All of the IOU's have provided sufficient information, detailing their proposed construction plans, for Embarq to estimate its cost impact for 2007 through 2009. The implementation of the "Process with in a Process" will allow Embarq to more accurately estimate our cost impact based on the IOU's scope of work being more accurately defined on an annual basis going forward.

To state a cost benefit at this phase of the Electric Plant Hardening efforts would be speculation. However, Embarq is expecting to have the following results: less damages to Embarq facilities caused by major weather events, resulting in fewer customers out of service, and faster restoration of service for customers who have their service disrupted by a major weather event.

8. **Is Embarq currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?**

Response: Yes.

a. **If your response to Staff Interrogatory No. 8 is Yes, please give examples of the level of information Embarq exchanges using NJUNS.**

Response: Embarq reviews and replies to the facility transfer requests from power companies. Embarq also creates a transfer request to its third party attachers for facility transfers when necessary.

b. ***If your response to Staff Interrogatory No. 8 is No, is Embarq planning on using NJUNS in the future for notifying parties of construction activities?***

Response: N/A

c. **If your response to Staff Interrogatory Number 8(b) is Yes, please describe how, when, and with whom will Embarq use NJUNS to exchange information regarding construction activities.**

Response: N/A

DATED this 25th day of September 2007.

s/ Susan S. Masterton
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ATTORNEY FOR EMBARQ FLORIDA, INC.

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Tampa Electric Company	Docket No. 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Progress Energy Florida, Inc.	Docket No. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Gulf Power Company	Docket No. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company	Docket No. 070301-EI **Served: September 24, 2007**

FLORIDA CABLE TELECOMMUNICATIONS ASSOCIATION INC.'S RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1–8)

Pursuant to Fla. Admin. Code R. 28-106.206, Rule 1.340 of the Florida Rules of Civil Procedure, and Order No. PSC-07-0573-PCO-EI dated July 10, 2007, the Florida Cable Telecommunications Association Inc.'s ("FCTA") hereby serves its responses to Staff's First Set of Interrogatories (Nos. 1–8).

GENERAL OBJECTIONS

1. FCTA objects to each and every Interrogatory to the extent that such request calls for information protected from discovery by virtue of the attorney-client or work product privileges as well as information that is proprietary, confidential business information, trade

Hearing Exhibit - 000841

secrets, or subject to other applicable privilege. To the extent FCTA responds to any Interrogatory, such response will not be, or be deemed to be, a waiver of any privilege or protection.

2. FCTA objects to each and every Interrogatory to the extent that they are overly broad, vague and ambiguous, or seek information not available in the format requested and/or not reasonably calculated to lead to the discovery of evidence admissible in this proceeding. To the extent FCTA responds to any Interrogatory, such response will not be, or be deemed to be, a waiver of this objection.

3. FCTA further objects to each Interrogatory to the extent that they seek information that is already in the public domain and/or in the possession of Staff and/or would require review of substantially every document in the possession of the parties to be tabulated for a response; thus, such discovery is unduly burdensome and time consuming. To the extent FCTA responds to any Interrogatory, such response will not be, or be deemed to be, a waiver of this objection.

RESPONSES TO FIRST SET OF INTERROGATORIES (NOS. 1-8)

Pursuant to Rule 28-106.106, Florida Administrative Code and Rule 1.340, Florida Rules of Civil Procedure, attached hereto are FCTA's Responses to Staff's First Set of Interrogatories (Nos. 1-8).

Respectfully submitted this 24th day of September, 2007.

/s/ John D. Seiver
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Attorneys for FCTA, Inc.

INTERROGATORIES

1. What is the revised estimate of FCTA's cost and benefit information associated with the Storm Hardening Plans for each of the IOUs that reflect the impact of any supplements to the original hardening plans or information obtained through negotiations or discussions with each IOU.

RESPONSE: FCTA's members have not yet been provided with the level of precise detail regarding the IOUs' Storm Hardening Plans that is necessary for FCTA to provide the level of input contemplated by Rule 25-6.0342. FCTA believes that in the case of some IOUs, the requisite level of detailed information may be exchanged through the Process To Engage Third Party Attachers which has been agreed to by the IOUs and FCTA, as well as other intervenors. More specifically:

Tampa Electric Company ("TECO")—*See* Direct Testimony of Michael T. Harrelson on Behalf of Florida Cable Telecommunications Association, Inc., *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Tampa Electric Company*, Docket No. 070297, at 19:7-16, 20:17-25, 39:21-40:19 (filed Sep. 7, 2007) ("Harrelson TECO Testimony").

TECO has provided information about its hardening projects to FCTA; however, TECO states that these projects are in the preliminary stages of planning. *See* Tampa Electric Company's Answers to First Set of Interrogatories (Nos. 1-44) of Florida Public Service Commission Staff Resp. to Interrog. No. 31 (filed Aug. 13, 2007). For this reason, it is difficult for FCTA member operators to provide cost and benefit estimates resulting from TECO's Plan. TECO agrees that it is difficult for third-party attachers to calculate precise benefits that may result from TECO's Plan until after the implementation of TECO's pilot projects. *See* Testimony of Regan B. Haines, *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Tampa Electric Company*, Docket No. 070297, at 22:14-18 (filed Aug. 24, 2007). TECO did provide an estimate of the increase to its annual cable TV pole attachment rental rates, estimating that such rents could increase up to $1.07 per pole. *See* Tampa Electric Company's Answers to First Set of Interrogatories (Nos. 1-30) of the Florida Cable Telecommunications Association, Inc. Resp. to Interrog. No. 1 (filed August 30, 2007). This represents a nearly 20% increase over existing pole rents. FCTA also anticipates a significant increase in makeready expenses, as well as expenses stemming from TECO's Pole Inspection Program and Joint Use Audit Programs set forth in Section 8.7 and 8.8 of TECO's Plan.

Progress Energy Florida—*See* Direct Testimony of Michael T. Harrelson on Behalf of Florida Cable Telecommunications Association, Inc., *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Progress Energy Florida, Inc.*, Docket No. 070298, at 18:8-24, 31:7-17 (filed Sep. 7, 2007) ("Harrelson PEF Testimony").

Hearing Exhibit - 000844

Although PEF's Plan includes high level cost estimates for 2007-09 for making infrastructure improvements, FCTA member operators cannot give precise cost and benefit information associated with PEF's Plan at this time because the Plan does not contain sufficient project level detail or quantify the benefits of implementing the Plan. However, because PEF does not plan to adopt EWL for new construction or major planned work, has retained NESC Grade C as its primary construction standard, and has agreed to work with FCTA to resolve existing disputes about its attachment standards and procedures for third party attachments, the resulting cost impact is not likely to be as significant on FCTA members as the Plans proposed by the three other IOUs. Moreover, FCTA believes that the hardening activity outlined in PEF's Plan will produce cost effective benefits.

Gulf Power Company—*See* Direct Testimony of Michael T. Harrelson on Behalf of Florida Cable Telecommunications Association, Inc., *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Gulf Power Company*, Docket No. 070299, at 20:23-21:7, 22:8-16, 41:20-42:17 (filed Sep. 7, 2007) ("Harrelson Gulf Testimony").

Gulf states that third party attachers should assume that make-ready costs and attachment rental rates will increase as a result of Gulf's Plan. *See* Gulf Power Company's Responses to Staff's First Set of Interrogatories (Nos. 1-47) Resp. to Interrog. No. 37 (filed Aug. 15, 2007). Gulf is also unable to provide the exact number of joint use poles that will impacted by Gulf's Plan for each year from 2007-09. Gulf's Resp. to Staff's Interrog. No. 40. Moreover, Gulf states that "it does not have further information which will enable third-party attachers to estimate the benefits of Gulf's Plan." Gulf's Resp. to Staff's Interrog. No. 38. This type of information, in addition to additional project level detail, is needed in order to provide an estimate of precise FCTA member operators costs and benefits.

Florida Power & Light Company—*See* Direct Testimony of Michael T. Harrelson on Behalf of Florida Cable Telecommunications Association, Inc., *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Florida Power & Light Company*, Docket No. 070301, at 29:7-16, 29:19-30:3, 45:19-46:22 (filed Sep. 7, 2007) ("Harrelson FPL Testimony").

FCTA has not estimated the total cost to its members in 2007, 2008 and 2009 because it does not yet have information about the full scope of hardening activities that FPL will undertake in 2007, 2008 and 2009, the overall cost of those activities, or the technical design specifications, construction standards, and construction methodologies that will be employed by FPL. *See Harrelson FPL Testimony*, 45:11-46:22. FPL computed an estimated impact on distribution pole rentals utilizing its 2007 distribution pole rental rate calculation (based on 2006 costs) updated with available estimated 2007 storm hardening costs and other available estimates, and estimated that the 2007 rate increased by approximately 2% as a result of hardening. *See* Florida Power & Light's Response To FCTA's First Set Of Interrogatories (Nos. 1-29) No. 1 (filed Aug. 30, 2007). Based upon information provided by FPL, FCTA estimated that the increase to the maximum

permitted annual pole attachment rental rates for cable television attachments prescribed by FCC formula to be approximately $0.09 per pole resulting from storm hardening activities in 2007. *See* Florida Power & Light's Response To FCTA's First Set Of Interrogatories (Nos. 1-29) Resp. to Interrog. No. 6 (filed Aug. 30, 2007). In addition, in response to a follow-up question posed by FCTA about this estimate, Mr. John Butler responded, "Our information indicates that the cumulative impact for 2007-2009 hardening projects will be approximately $1/pole."

In addition to this estimated increase in pole attachment rental rates, FCTA estimates that it will incur increased make-ready costs. However, FCTA is unable to estimate at this time what the amount of that increase will be because it does not yet have information about the full scope of hardening activities that FPL will undertake in 2007, 2008 and 2009, the overall cost of those activities, or the technical design specifications, construction standards, and construction methodologies that will be employed by FPL. FCTA requested this information from FPL in its interrogatories, to which FPL responded, "FPL does not know the impact (or incremental cost difference) for make-ready that Storm Hardening will have on 3rd party attachers. However, make-ready costs are likely to increase as a result of the constructions set forth in FPL's Plan." *See* FPL's Resp. to FCTA's Interrog. No 2. FPL also stated that "[i]f the attacher requires a new pole either to accommodate their load (the design load of the pole would be compromised) or to create more space on the pole to accommodate their new attachment, the new pole must be of a class to meet FPL's Storm Hardening Plan filed with the Florida Public Service Commission." *See* FPL's Resp. to FCTA's Interrog. No 14.

2. In response to Staff's first set of interrogatories, FPL stated that it intends to replace 2000 poles in 2007. What is FCTA's total estimated transfer cost associated with these poles assuming FCTA was attached to each pole being replaced?

RESPONSE: For accessible locations, $100 to $300 on average for new attachments to newly installed intermediate wood poles. These amounts will vary depending upon the region in which the attachments are being made. The cost to attach to newly installed intermediate concrete poles can be higher or close to the same as for wood poles if the concrete poles are pre-drilled or banded for third party attachments. These estimates are for labor only. The total costs to transfer a pole attachment to a pole will vary widely depending upon the factors including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, and prevailing labor and material costs in the region where the new pole is set. The costs could vary from as little as $500 to the tens of thousands depending on the circumstances. *See Harrelson FPL Testimony*, 30:15-20.

a. Please provide a detailed analysis of FCTA's total estimated transfer cost stated in Staff's Interrogatory No. 2.

RESPONSE: As set forth above, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs.

b. Assuming FPL replaces the same number of poles in 2008 and 2009 as they project for 2007, what are FCTA's total estimated transfer costs for 2008 and 2009?

RESPONSE: As stated, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs. Transfer costs for later years may also be impacted by increased labor and material costs. *See also Harrelson FPL Testimony*, 29:7-16.

Hearing Exhibit - 000847

3. In response to Staff's first set of interrogatories, Gulf has indicated it will be replacing approximately 650 poles in 2007, 650 in 2008, and 650 in 2009. What is FCTA's total estimated transfer cost associated with these poles assuming FCTA was attached to each pole being replaced?

RESPONSE: For accessible locations, $100 to $300 on average for new attachments to newly installed intermediate wood poles. These amounts will vary depending upon the region in which the attachments are being made. The cost to attach to newly installed intermediate concrete poles can be higher or close to the same as for wood poles if the concrete poles are pre-drilled or banded for third party attachments. These estimates are for labor only. The total costs to transfer a pole attachment will vary widely depending upon the factors including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, and prevailing labor and material costs in the region where the new pole is set. These costs could vary from as little as $500 to the tens of thousands depending on the circumstances. *See Harrelson Gulf Testimony*, 21:19-24.

In addition, Gulf stated that its Plan will impact 650 poles. The possible replacement will be determined by detailed loading analysis. Five hundred of those poles annually will be of poles evaluated to determine if poles with 3 or more cable attachments are overloaded. Gulf has added non-strength related requirements to this inspection which will likely assess blame on attachers to bear the total cost of replacement of many of these 500 poles even if they are not overloaded. The minimum replacement costs for Gulf alone is likely to exceed $5,000 per pole.

a. Please provide a detailed analysis of FCTA's total estimated transfer cost stated in Staff's Interrogatory No. 3.

RESPONSE: As set forth above, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs. Moreover, transfer costs for later years may also be impacted by increased labor and material costs.

4. Staff estimates that PEF may replace approximately 1,375 poles in 2007. What is FCTA's total estimated transfer cost associated with these poles assuming FCTA was attached to each pole being replaced?

RESPONSE: For accessible locations, $100 to $300 on average for new attachments to newly installed intermediate wood poles. These amounts will vary depending upon the region in which the attachments are being made. The cost to attach to newly installed intermediate concrete poles can be higher or close to the same as for wood poles if the concrete poles are pre-drilled or banded for third party attachments. These estimates are for labor only. The total costs to transfer a pole attachment will vary widely depending upon the factors including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, and prevailing labor and material costs in the region where the new pole is set. These costs could vary from as little as $500 to the tens of thousands depending on the circumstances.

a. Please provide a detailed analysis of FCTA's total estimated transfer cost stated in Staff's Interrogatory No. 4.

RESPONSE: As set forth above, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs.

b. Assuming PEF replaces the same number of poles in 2008 and 2009 as staff projected PEF may replace for 2007, what are FCTA's total estimated transfer costs for 2008 and 2009?

RESPONSE: As stated, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs. Transfer costs for later years may also be impacted by increased labor and material costs.

Hearing Exhibit - 000849

5. In responses to Staff's first set of interrogatories, TECO has indicated that it will be replacing a total of 835 poles in 2007-2009. What is FCTA's total estimated transfer cost associated with these poles assuming FCTA was attached to each pole being replaced?

RESPONSE: For accessible locations, $100 to $300 on average for new attachments to newly installed intermediate wood poles. These amounts will vary depending upon the region in which the attachments are being made. The cost to attach to newly installed intermediate concrete poles can be higher or close to the same as for wood poles if the concrete poles are pre-drilled or banded for third party attachments. These estimates are for labor only. The total costs to transfer a pole attachment will vary widely depending upon the factors including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, and prevailing labor and material costs in the region where the new pole is set. These costs could vary from as little as $500 to the tens of thousands depending on the circumstances. *See Harrelson TECO Testimony*, 20:3-8.

In addition, FCTA members will also incur transfer costs related to TECO's loading analysis of poles with cable attachments. See response to Interrogatory No. 6.

a. Please provide a detailed analysis of FCTA's total estimated transfer cost stated in Staff's Interrogatory No. 5.

RESPONSE: As set forth above, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs. Transfer costs for later years may also be impacted by increased labor and material costs.

6. What other cost elements may FCTA incur in storm hardening efforts other than the pole transfer costs for each IOU?

RESPONSE: Other than transfer costs associated with pole change outs necessitated by building to new construction standards (i.e., Grade B or EWL), the general costs that FCTA members may incur as a result of storm hardening efforts include: (a) increased rental rates, (b) increased number of poles on which rental rates are paid, (c) increased make-ready costs for new attachments, and (d) increased costs resulting from guying, pole rearrangements and pole change outs required by IOUs as a result of audits/inspections—this last point is tied directly to how the IOU intends to assign responsibility when it finds that a pole has violations, what standards are applied (i.e., NESC or more stringent requirements), and what the audit/inspection is intended to address (just loading or an overinclusive analysis of clearance standards that exceed NESC).

FCTA does not yet have enough information about the specific projects, construction and engineering plans, and costs and benefits of the IOUs' storm hardening plans to provide a specific estimate of the costs and benefits that the plans will have on its cable operator members.

The general costs set forth above are tightly prescribed by the FCC. Under the federal scheme, FCTA members pay both make-ready costs—i.e., the cost of making the pole ready for its attachments (including the cost of rearranging existing facilities on the pole, guying the pole to increase strength, or replacing the pole where necessary) and annual rent pursuant to the FCC's rate formula, which assures that pole owners receive the fully allocated costs of accommodating the attachment. The annual pole attachment rent is determined by multiplying the percentage of the total usable space occupied by the pole attachment by the sum of the operating expenses and actual capital costs of the utility attributable to the entire pole. In addition, depending upon the circumstances, cable operators may incur the cost of transferring their facilities to a new pole.

FCTA members have been told that some of the IOUs' rental rates will increase as a result of the storm hardening plans. Specifically, FPL estimates that as a result of the three year plan rental rates may increase by $1.00 per pole or about 11.5 percent. *See* Response to Interrogatory No. 1 above. Cable operators pay approximately $2,000,000 in rental to FPL annually. An increase of this amount is equivalent to an additional $230,000 per year. FPL also plans to add a significant number of poles, thereby increasing the number of poles on which cable operators pay rent. Similarly, based upon information provided by Gulf, FCTA estimated that due to Gulf's activities included in the first year of the Plan cable operator rents would increase by $0.32 per pole. Assuming a similar trajectory for the three year period, Gulf's rates would also increase by approximately $1.00 per pole, or by approximately 16%. *See* Gulf Power Company's Responses to FCTA's First Request for Production of Documents (Nos. 1-24) Resp. to Interrog. No. 6. Cable operator rents to Gulf are approximately $1,000,000 annually and would increase of $160,000 per year. Where new poles are set, cable operators will incur additional pole attachment rentals. TECO estimates that its pole attachment rents could

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increase up to $1.07 per pole. *See* Tampa Electric Company's Answers to First Set of Interrogatories (Nos. 1-30) of the Florida Cable Telecommunications Association, Inc. Resp. to Interrog. No. 1 (filed August 30, 2007). This represents a nearly 20% increase over existing pole rents. PEF provided additional project detail and cost information in its supplement to its Storm Hardening Plan filed August 7, 2007. This information is helpful but the detailed information that is required for FCTA to calculate the precise impact on pole rental rates is not yet available.

None of the utilities have been able to predict the increase in make-ready costs. This is understandable given the very specific nature of make-ready work. Annual expenditures for make-ready already typically equal or exceed annual pole rental expenditures. FCTA anticipates that make-ready costs will increase significantly due to additional inspections, additional strength requirements and more intermediate poles.

Tampa Electric Company—*See Harrelson TECO Testimony*, 7:1-20, 20:3-16.

Progress Energy Florida—*See Harrelson PEF Testimony*, 7:1-22, 19:12-15.

Gulf Power Company—*See Harrelson Gulf Testimony*, 8:3-22, 21:19-22:7.

Florida Power & Light Company—*See Harrelson FPL Testimony*, 7:6-25, 30:15-31:3.

7. What specific additional information, if any, is needed from each IOU that FCTA is attached to in order for FCTA to provide an estimate of cost benefit data for storm hardening projects in 2007, 2008 and 2009?

RESPONSE: To provide an accurate estimate, FCTA members must know each pole that will require replacement and the placement locations of each new pole, as well as all cable adjustments and rearrangements required on poles that do not require replacement. This level of information will not be available until engineering and preconstruction details have been settled by the power company. Only a range of costs can be estimated at this time. Since 3 of 4 IOU's have not done these types of projects before, and have not yet even done the engineering, the wide range of estimates of costs to cable attachers are somewhat speculative. See FCTA Response to Interrogatory 1 hereto.

Hearing Exhibit - 000853

8. Is FCTA currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?

RESPONSE: Many of FCTA member operators use NJUNS in some or all parts of their service territories.

a. If your response to Staff Interrogatory No. 8 is Yes, please give examples of the level of information FCTA exchanges using NJUNS.

RESPONSE: The National Joint Use Notification System is used to notify joint pole users of pole locations where action will be or presently is required by each attached entity. NJUNS identifies the next entity required to take action and provides a brief description of the required actions (i.e., move facilities up or down, transfer facilities, etc.). That entity then is required to update the "pole ticket" after it has completed its step and NJUNS will notify the "next to go" of the action required of it. NJUNS is also capable of other kinds of information to joint users. The NJUNS Manual is available at:

http://www.ojuns.com/NJUNS_Manual_2004.doc.

b. If your response to Staff Interrogatory No. 8 is No, is FCTA planning on using NJUNS in the future for notifying parties of construction activities?

RESPONSE: At this time, FCTA members operators that do not currently use NJUNS have not made a decision to use NJUNS.

c. If your response to Staff Interrogatory No. 8(b) is Yes, please describe how, when and with whom will FCTA use NJUNS to exchange information regarding construction activities.

RESPONSE: Not applicable

Individuals responsible for Responses and Objections to Florida Power and Light Company's First Set of Interrogatories and First Request for Production of Documents:

Objections:

Counsel and Mr. Harrelson

Answers to Interrogatories:

1. Mr. Harrelson and Counsel
2. Mr. Harrelson and Counsel
3. Mr. Harrelson and Counsel
4. Mr. Harrelson and Counsel
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8. Mr. Harrelson and Counsel

Respectfully submitted this 24th day of September, 2007.

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Docket No. 070297-EI
Docket No. 070297-EI
Docket No. 070297-EI
Docket No. 070297-EI

Before me the undersigned authority, personally appeared Michael T. Harrelson, expert tness for the Florida Cable Telecommunications Association ("FCTA"), being first duly orn, deposes and says that pursuant to Rule 1.340(a), Florida Rules of Civil Procedure, he ifies that the foregoing responses to interrogatories and document requests that he drafted are mitted on behalf of FCTA, and that those foregoing responses are true and correct to the best his knowledge, information, and belief, based on personal knowledge and/or the information vided by others in the course of business. He is personally known to me.

Michael T. Harrelson
Michael T. Harrelson

Sworn to and subscribed to before me this 26 day of September, 2007.

Cathy Taylor
tary Public

commission expires:

CATHY TAYLOR NOTARY PUBLIC EXPIRES GEORGIA OCT. 1, 2008 TELFAIR COUNTY

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CERTIFICATE OF SERVICE

I hereby certify that a true and a correct copy was furnished via Electronic Mail and First Class U.S. mail on this 24th day of September, 2007 to the following:

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September 24, 20007

VIA ELECTRONIC FILING
Ms. Ann Cole
Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: **Docket No. 070297-EI** - Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Tampa Electric Company
Docket No. 070298-EI – Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Progress Energy Florida, Inc.
Docket No. 070299-EI – Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Gulf Power Company.
Docket No. 070301-EI – Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Florida Power and Light Company.

Dear Ms. Cole:

Enclosed for filing in the above-referenced Docket, please find the Florida Cable Telecommunications Association Inc.'s Notice of Service of Responses to Staff's First Set of Interrogatories (Nos. 1-8).

Hearing Exhibit - 000860

Should you have any questions, please do not hesitate to contact me.

Sincerely,

/s/ Maria T. Browne

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Tampa Electric Company	Docket No. 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Progress Energy Florida, Inc.	Docket No. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Gulf Power Company	Docket No. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company	Docket No. 070301-EI **Filed: September 24, 2007**

FLORIDA CABLE TELECOMMUNICATIONS ASSOCIATION, INC.'S NOTICE OF SERVICE OF RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1-8)

The Florida Cable Telecommunications Association, Inc. (FCTA), by and through its undersigned counsel, hereby gives notice of serving FCTA's Responses to Staff's First Set of Interrogatories (Nos. 1-8), on September 24, 2007.

Respectfully submitted this 24th day of September, 2007.

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I HEREBY CERTIFY that a true and correct copy of the foregoing has been served via Electronic Mail, and First Class US Mail to the persons listed below this 24th day of September, 2007:

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Tampa Electric Company	Docket No. 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Progress Energy Florida, Inc.	Docket No. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Gulf Power Company	Docket No. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company	Docket No. 070301-EI **Served: September 24, 2007**

FLORIDA CABLE TELECOMMUNICATIONS ASSOCIATION INC.'S RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1–8)

Pursuant to Fla. Admin. Code R. 28-106.206, Rule 1.340 of the Florida Rules of Civil Procedure, and Order No. PSC-07-0573-PCO-EI dated July 10, 2007, the Florida Cable Telecommunications Association Inc.'s ("FCTA") hereby serves its responses to Staff's First Set of Interrogatories (Nos. 1–8).

GENERAL OBJECTIONS

1. FCTA objects to each and every Interrogatory to the extent that such request calls for information protected from discovery by virtue of the attorney-client or work product privileges as well as information that is proprietary, confidential business information, trade

secrets, or subject to other applicable privilege. To the extent FCTA responds to any Interrogatory, such response will not be, or be deemed to be, a waiver of any privilege or protection.

2. FCTA objects to each and every Interrogatory to the extent that they are overly broad, vague and ambiguous, or seek information not available in the format requested and/or not reasonably calculated to lead to the discovery of evidence admissible in this proceeding. To the extent FCTA responds to any Interrogatory, such response will not be, or be deemed to be, a waiver of this objection.

3. FCTA further objects to each Interrogatory to the extent that they seek information that is already in the public domain and/or in the possession of Staff and/or would require review of substantially every document in the possession of the parties to be tabulated for a response; thus, such discovery is unduly burdensome and time consuming. To the extent FCTA responds to any Interrogatory, such response will not be, or be deemed to be, a waiver of this objection.

RESPONSES TO FIRST SET OF INTERROGATORIES (NOS. 1-8)

Pursuant to Rule 28-106.106, Florida Administrative Code and Rule 1.340, Florida Rules of Civil Procedure, attached hereto are FCTA's Responses to Staff's First Set of Interrogatories (Nos. 1-8).

Respectfully submitted this 24th day of September, 2007.

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INTERROGATORIES

1. What is the revised estimate of FCTA's cost and benefit information associated with the Storm Hardening Plans for each of the IOUs that reflect the impact of any supplements to the original hardening plans or information obtained through negotiations or discussions with each IOU.

RESPONSE: FCTA's members have not yet been provided with the level of precise detail regarding the IOUs' Storm Hardening Plans that is necessary for FCTA to provide the level of input contemplated by Rule 25-6.0342. FCTA believes that in the case of some IOUs, the requisite level of detailed information may be exchanged through the Process To Engage Third Party Attachers which has been agreed to by the IOUs and FCTA, as well as other intervenors. More specifically:

Tampa Electric Company ("TECO")—*See* Direct Testimony of Michael T. Harrelson on Behalf of Florida Cable Telecommunications Association, Inc., *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Tampa Electric Company*, Docket No. 070297, at 19:7-16, 20:17-25, 39:21-40:19 (filed Sep. 7, 2007) ("Harrelson TECO Testimony").

TECO has provided information about its hardening projects to FCTA; however, TECO states that these projects are in the preliminary stages of planning. *See* Tampa Electric Company's Answers to First Set of Interrogatories (Nos. 1-44) of Florida Public Service Commission Staff Resp. to Interrog. No. 31 (filed Aug. 13, 2007). For this reason, it is difficult for FCTA member operators to provide cost and benefit estimates resulting from TECO's Plan. TECO agrees that it is difficult for third-party attachers to calculate precise benefits that may result from TECO's Plan until after the implementation of TECO's pilot projects. *See* Testimony of Regan B. Haines, *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Tampa Electric Company*, Docket No. 070297, at 22:14-18 (filed Aug. 24, 2007). TECO did provide an estimate of the increase to its annual cable TV pole attachment rental rates, estimating that such rents could increase up to $1.07 per pole. *See* Tampa Electric Company's Answers to First Set of Interrogatories (Nos. 1-30) of the Florida Cable Telecommunications Association, Inc. Resp. to Interrog. No. 1 (filed August 30, 2007). This represents a nearly 20% increase over existing pole rents. FCTA also anticipates a significant increase in makeready expenses, as well as expenses stemming from TECO's Pole Inspection Program and Joint Use Audit Programs set forth in Section 8.7 and 8.8 of TECO's Plan.

Progress Energy Florida—*See* Direct Testimony of Michael T. Harrelson on Behalf of Florida Cable Telecommunications Association, Inc., *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Progress Energy Florida, Inc.*, Docket No. 070298, at 18:8-24, 31:7-17 (filed Sep. 7, 2007) ("Harrelson PEF Testimony").

Although PEF's Plan includes high level cost estimates for 2007-09 for making infrastructure improvements, FCTA member operators cannot give precise cost and benefit information associated with PEF's Plan at this time because the Plan does not contain sufficient project level detail or quantify the benefits of implementing the Plan. However, because PEF does not plan to adopt EWL for new construction or major planned work, has retained NESC Grade C as its primary construction standard, and has agreed to work with FCTA to resolve existing disputes about its attachment standards and procedures for third party attachments, the resulting cost impact is not likely to be as significant on FCTA members as the Plans proposed by the three other IOUs. Moreover, FCTA believes that the hardening activity outlined in PEF's Plan will produce cost effective benefits.

Gulf Power Company—*See* Direct Testimony of Michael T. Harrelson on Behalf of Florida Cable Telecommunications Association, Inc., *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Gulf Power Company*, Docket No. 070299, at 20:23-21:7, 22:8-16, 41:20-42:17 (filed Sep. 7, 2007) ("Harrelson Gulf Testimony").

Gulf states that third party attachers should assume that make-ready costs and attachment rental rates will increase as a result of Gulf's Plan. *See* Gulf Power Company's Responses to Staff's First Set of Interrogatories (Nos. 1-47) Resp. to Interrog. No. 37 (filed Aug. 15, 2007). Gulf is also unable to provide the exact number of joint use poles that will impacted by Gulf's Plan for each year from 2007-09. Gulf's Resp. to Staff's Interrog. No. 40. Moreover, Gulf states that "it does not have further information which will enable third-party attachers to estimate the benefits of Gulf's Plan." Gulf's Resp. to Staff's Interrog. No. 38. This type of information, in addition to additional project level detail, is needed in order to provide an estimate of precise FCTA member operators costs and benefits.

Florida Power & Light Company—*See* Direct Testimony of Michael T. Harrelson on Behalf of Florida Cable Telecommunications Association, Inc., *In re Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Florida Power & Light Company*, Docket No. 070301, at 29:7-16, 29:19-30:3, 45:19-46:22 (filed Sep. 7, 2007) ("Harrelson FPL Testimony").

FCTA has not estimated the total cost to its members in 2007, 2008 and 2009 because it does not yet have information about the full scope of hardening activities that FPL will undertake in 2007, 2008 and 2009, the overall cost of those activities, or the technical design specifications, construction standards, and construction methodologies that will be employed by FPL. *See Harrelson FPL Testimony*, 45:11-46:22. FPL computed an estimated impact on distribution pole rentals utilizing its 2007 distribution pole rental rate calculation (based on 2006 costs) updated with available estimated 2007 storm hardening costs and other available estimates, and estimated that the 2007 rate increased by approximately 2% as a result of hardening. *See* Florida Power & Light's Response To FCTA's First Set Of Interrogatories (Nos. 1-29) No. 1 (filed Aug. 30, 2007). Based upon information provided by FPL, FCTA estimated that the increase to the maximum

permitted annual pole attachment rental rates for cable television attachments prescribed by FCC formula to be approximately $0.09 per pole resulting from storm hardening activities in 2007. *See* Florida Power & Light's Response To FCTA's First Set Of Interrogatories (Nos. 1-29) Resp. to Interrog. No. 6 (filed Aug. 30, 2007). In addition, in response to a follow-up question posed by FCTA about this estimate, Mr. John Butler responded, "Our information indicates that the cumulative impact for 2007-2009 hardening projects will be approximately $1/pole."

In addition to this estimated increase in pole attachment rental rates, FCTA estimates that it will incur increased make-ready costs. However, FCTA is unable to estimate at this time what the amount of that increase will be because it does not yet have information about the full scope of hardening activities that FPL will undertake in 2007, 2008 and 2009, the overall cost of those activities, or the technical design specifications, construction standards, and construction methodologies that will be employed by FPL. FCTA requested this information from FPL in its interrogatories, to which FPL responded, "FPL does not know the impact (or incremental cost difference) for make-ready that Storm Hardening will have on 3rd party attachers. However, make-ready costs are likely to increase as a result of the constructions set forth in FPL's Plan." *See* FPL's Resp. to FCTA's Interrog. No 2. FPL also stated that "[i]f the attacher requires a new pole either to accommodate their load (the design load of the pole would be compromised) or to create more space on the pole to accommodate their new attachment, the new pole must be of a class to meet FPL's Storm Hardening Plan filed with the Florida Public Service Commission." *See* FPL's Resp. to FCTA's Interrog. No 14.

2. In response to Staff's first set of interrogatories, FPL stated that it intends to replace 2000 poles in 2007. What is FCTA's total estimated transfer cost associated with these poles assuming FCTA was attached to each pole being replaced?

RESPONSE: For accessible locations, $100 to $300 on average for new attachments to newly installed intermediate wood poles. These amounts will vary depending upon the region in which the attachments are being made. The cost to attach to newly installed intermediate concrete poles can be higher or close to the same as for wood poles if the concrete poles are pre-drilled or banded for third party attachments. These estimates are for labor only. The total costs to transfer a pole attachment to a pole will vary widely depending upon the factors including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, and prevailing labor and material costs in the region where the new pole is set. The costs could vary from as little as $500 to the tens of thousands depending on the circumstances. *See Harrelson FPL Testimony*, 30:15-20.

a. Please provide a detailed analysis of FCTA's total estimated transfer cost stated in Staff's Interrogatory No. 2.

RESPONSE: As set forth above, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs.

b. Assuming FPL replaces the same number of poles in 2008 and 2009 as they project for 2007, what are FCTA's total estimated transfer costs for 2008 and 2009?

RESPONSE: As stated, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs. Transfer costs for later years may also be impacted by increased labor and material costs. *See also Harrelson FPL Testimony*, 29:7-16.

3. In response to Staff's first set of interrogatories, Gulf has indicated it will be replacing approximately 650 poles in 2007, 650 in 2008, and 650 in 2009. What is FCTA's total estimated transfer cost associated with these poles assuming FCTA was attached to each pole being replaced?

RESPONSE: For accessible locations, $100 to $300 on average for new attachments to newly installed intermediate wood poles. These amounts will vary depending upon the region in which the attachments are being made. The cost to attach to newly installed intermediate concrete poles can be higher or close to the same as for wood poles if the concrete poles are pre-drilled or banded for third party attachments. These estimates are for labor only. The total costs to transfer a pole attachment will vary widely depending upon the factors including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, and prevailing labor and material costs in the region where the new pole is set. These costs could vary from as little as $500 to the tens of thousands depending on the circumstances. *See Harrelson Gulf Testimony*, 21:19-24.

In addition, Gulf stated that its Plan will impact 650 poles. The possible replacement will be determined by detailed loading analysis. Five hundred of those poles annually will be of poles evaluated to determine if poles with 3 or more cable attachments are overloaded. Gulf has added non-strength related requirements to this inspection which will likely assess blame on attachers to bear the total cost of replacement of many of these 500 poles even if they are not overloaded. The minimum replacement costs for Gulf alone is likely to exceed $5,000 per pole.

a. Please provide a detailed analysis of FCTA's total estimated transfer cost stated in Staff's Interrogatory No. 3.

RESPONSE: As set forth above, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs. Moreover, transfer costs for later years may also be impacted by increased labor and material costs.

4. Staff estimates that PEF may replace approximately 1,375 poles in 2007. What is FCTA's total estimated transfer cost associated with these poles assuming FCTA was attached to each pole being replaced?

RESPONSE: For accessible locations, $100 to $300 on average for new attachments to newly installed intermediate wood poles. These amounts will vary depending upon the region in which the attachments are being made. The cost to attach to newly installed intermediate concrete poles can be higher or close to the same as for wood poles if the concrete poles are pre-drilled or banded for third party attachments. These estimates are for labor only. The total costs to transfer a pole attachment will vary widely depending upon the factors including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, and prevailing labor and material costs in the region where the new pole is set. These costs could vary from as little as $500 to the tens of thousands depending on the circumstances.

a. Please provide a detailed analysis of FCTA's total estimated transfer cost stated in Staff's Interrogatory No. 4.

RESPONSE: As set forth above, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs.

b. Assuming PEF replaces the same number of poles in 2008 and 2009 as staff projected PEF may replace for 2007, what are FCTA's total estimated transfer costs for 2008 and 2009?

RESPONSE: As stated, there are too many variables to account for--including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs. Transfer costs for later years may also be impacted by increased labor and material costs.

5. In responses to Staff's first set of interrogatories, TECO has indicated that it will be replacing a total of 835 poles in 2007-2009. What is FCTA's total estimated transfer cost associated with these poles assuming FCTA was attached to each pole being replaced?

RESPONSE: For accessible locations, $100 to $300 on average for new attachments to newly installed intermediate wood poles. These amounts will vary depending upon the region in which the attachments are being made. The cost to attach to newly installed intermediate concrete poles can be higher or close to the same as for wood poles if the concrete poles are pre-drilled or banded for third party attachments. These estimates are for labor only. The total costs to transfer a pole attachment will vary widely depending upon the factors including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, and prevailing labor and material costs in the region where the new pole is set. These costs could vary from as little as $500 to the tens of thousands depending on the circumstances. *See Harrelson TECO Testimony*, 20:3-8.

In addition, FCTA members will also incur transfer costs related to TECO's loading analysis of poles with cable attachments. See response to Interrogatory No. 6.

a. Please provide a detailed analysis of FCTA's total estimated transfer cost stated in Staff's Interrogatory No. 5.

RESPONSE: As set forth above, there are too many variables to account for—including but not limited to whether new poles will be accessible, whether new poles will be set at or near the site of the old pole, whether the new pole will be wood or concrete, and if concrete, pre-drilled or banded, prevailing labor and material costs in the region where the new pole is set, etc.—to provide a detailed analysis of FCTA's total estimated transfer costs. Transfer costs for later years may also be impacted by increased labor and material costs.

6. What other cost elements may FCTA incur in storm hardening efforts other than the pole transfer costs for each IOU?

RESPONSE: Other than transfer costs associated with pole change outs necessitated by building to new construction standards (i.e., Grade B or EWL), the general costs that FCTA members may incur as a result of storm hardening efforts include: (a) increased rental rates, (b) increased number of poles on which rental rates are paid, (c) increased make-ready costs for new attachments, and (d) increased costs resulting from guying, pole rearrangements and pole change outs required by IOUs as a result of audits/inspections—this last point is tied directly to how the IOU intends to assign responsibility when it finds that a pole has violations, what standards are applied (i.e., NESC or more stringent requirements), and what the audit/inspection is intended to address (just loading or an overinclusive analysis of clearance standards that exceed NESC).

FCTA does not yet have enough information about the specific projects, construction and engineering plans, and costs and benefits of the IOUs' storm hardening plans to provide a specific estimate of the costs and benefits that the plans will have on its cable operator members.

The general costs set forth above are tightly prescribed by the FCC. Under the federal scheme, FCTA members pay both make-ready costs—i.e., the cost of making the pole ready for its attachments (including the cost of rearranging existing facilities on the pole, guying the pole to increase strength, or replacing the pole where necessary) and annual rent pursuant to the FCC's rate formula, which assures that pole owners receive the fully allocated costs of accommodating the attachment. The annual pole attachment rent is determined by multiplying the percentage of the total usable space occupied by the pole attachment by the sum of the operating expenses and actual capital costs of the utility attributable to the entire pole. In addition, depending upon the circumstances, cable operators may incur the cost of transferring their facilities to a new pole.

FCTA members have been told that some of the IOUs' rental rates will increase as a result of the storm hardening plans. Specifically, FPL estimates that as a result of the three year plan rental rates may increase by $1.00 per pole or about 11.5 percent. *See* Response to Interrogatory No. 1 above. Cable operators pay approximately $2,000,000 in rental to FPL annually. An increase of this amount is equivalent to an additional $230,000 per year. FPL also plans to add a significant number of poles, thereby increasing the number of poles on which cable operators pay rent. Similarly, based upon information provided by Gulf, FCTA estimated that due to Gulf's activities included in the first year of the Plan cable operator rents would increase by $0.32 per pole. Assuming a similar trajectory for the three year period, Gulf's rates would also increase by approximately $1.00 per pole, or by approximately 16%. *See* Gulf Power Company's Responses to FCTA's First Request for Production of Documents (Nos. 1-24) Resp. to Interrog. No. 6. Cable operator rents to Gulf are approximately $1,000,000 annually and would increase of $160,000 per year. Where new poles are set, cable operators will incur additional pole attachment rentals. TECO estimates that its pole attachment rents could

increase up to $1.07 per pole. *See* Tampa Electric Company's Answers to First Set of Interrogatories (Nos. 1-30) of the Florida Cable Telecommunications Association, Inc. Resp. to Interrog. No. 1 (filed August 30, 2007). This represents a nearly 20% increase over existing pole rents. PEF provided additional project detail and cost information in its supplement to its Storm Hardening Plan filed August 7, 2007. This information is helpful but the detailed information that is required for FCTA to calculate the precise impact on pole rental rates is not yet available.

None of the utilities have been able to predict the increase in make-ready costs. This is understandable given the very specific nature of make-ready work. Annual expenditures for make-ready already typically equal or exceed annual pole rental expenditures. FCTA anticipates that make-ready costs will increase significantly due to additional inspections, additional strength requirements and more intermediate poles.

Tampa Electric Company—*See Harrelson TECO Testimony*, 7:1-20, 20:3-16.

Progress Energy Florida—*See Harrelson PEF Testimony*, 7:1-22, 19:12-15.

Gulf Power Company—*See Harrelson Gulf Testimony*, 8:3-22, 21:19-22:7.

Florida Power & Light Company—*See Harrelson FPL Testimony*, 7:6-25, 30:15-31:3.

7. What specific additional information, if any, is needed from each IOU that FCTA is attached to in order for FCTA to provide an estimate of cost benefit data for storm hardening projects in 2007, 2008 and 2009?

RESPONSE: To provide an accurate estimate, FCTA members must know each pole that will require replacement and the placement locations of each new pole, as well as all cable adjustments and rearrangements required on poles that do not require replacement. This level of information will not be available until engineering and preconstruction details have been settled by the power company. Only a range of costs can be estimated at this time. Since 3 of 4 IOU's have not done these types of projects before, and have not yet even done the engineering, the wide range of estimates of costs to cable attachers are somewhat speculative. See FCTA Response to Interrogatory 1 hereto.

8. Is FCTA currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?

RESPONSE: Many of FCTA member operators use NJUNS in some or all parts of their service territories.

a. If your response to Staff Interrogatory No. 8 is Yes, please give examples of the level of information FCTA exchanges using NJUNS.

RESPONSE: The National Joint Use Notification System is used to notify joint pole users of pole locations where action will be or presently is required by each attached entity. NJUNS identifies the next entity required to take action and provides a brief description of the required actions (i.e., move facilities up or down, transfer facilities, etc.). That entity then is required to update the "pole ticket" after it has completed its step and NJUNS will notify the "next to go" of the action required of it. NJUNS is also capable of other kinds of information to joint users. The NJUNS Manual is available at:

http://www.ojuns.com/NJUNS_Manual_2004.doc.

b. If your response to Staff Interrogatory No. 8 is No, is FCTA planning on using NJUNS in the future for notifying parties of construction activities?

RESPONSE: At this time, FCTA members operators that do not currently use NJUNS have not made a decision to use NJUNS.

c. If your response to Staff Interrogatory No. 8(b) is Yes, please describe how, when and with whom will FCTA use NJUNS to exchange information regarding construction activities.

RESPONSE: Not applicable

Individuals responsible for Responses and Objections to Florida Power and Light Company's First Set of Interrogatories and First Request for Production of Documents:

Objections:

Counsel and Mr. Harrelson

Answers to Interrogatories:

1. Mr. Harrelson and Counsel
2. Mr. Harrelson and Counsel
3. Mr. Harrelson and Counsel
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7. Mr. Harrelson
8. Mr. Harrelson and Counsel

Respectfully submitted this 24th day of September, 2007.

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Docket No. 070297-EI
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Before me the undersigned authority, personally appeared Michael T. Harrelson, expert tness for the Florida Cable Telecommunications Association ("FCTA"), being first duly orn, deposes and says that pursuant to Rule 1.340(a), Florida Rules of Civil Procedure, he ifies that the foregoing responses to interrogatories and document requests that he drafted are mitted on behalf of FCTA, and that those foregoing responses are true and correct to the best his knowledge, information, and belief, based on personal knowledge and/or the information vided by others in the course of business. He is personally known to me.

Michael T. Harrelson

Sworn to and subscribed to before me this 26 day of September, 2007.

tary Public

commission expires:

CATHY TAYLOR NOTARY PUBLIC EXPIRES GEORGIA OCT 1, 2008 TELFAIR COUNTY

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Hearing Exhibit – 866-P

CERTIFICATE OF SERVICE

I hereby certify that a true and a correct copy was furnished via Electronic Mail and First Class U.S. mail on this 24th day of September, 2007 to the following:

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/s/ John D. Seiver
John D. Seiver

BEFORE THE PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company.	)	DOCKET NO. 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	)	DOCKET NO. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company,	)	DOCKET NO. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company	)	DOCKET NO. 070301-EI

TELEPHONIC DEPOSITION OF MICKEY HARRELSON

Tuesday, September 18, 2007
10:11 a.m. - 3:32 p.m.

700 Universe Boulevard
Juno Beach, Florida 33408

Reported By:
Pamela J. Sullivan, RPR, FPR
Notary Public, State of Florida
Esquire Deposition Services
West Palm Beach Office Job #893056

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Natalie Smith, Esquire, for FPL
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Roberto L. Valdez, FPL

- - -

I N D E X

- - -

WITNESS:	DIRECT	CROSS	REDIRECT	RECROSS
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P R O C E E D I N G S

- - -

Deposition taken before Pamela J. Sullivan, Registered Professional Court Reporter and Notary Public in and for the State of Florida at Large, in the above cause.

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MR. BUTLER: We'll start with Mr. Seiver as defending the witness.

Hey, John, I know you've already given your name, but can you just give your name and address for the record, please.

MR. SEIVER: Okay. I am John Seiver, counsel for Intervenor, Florida Cable Telecommunications Association, and I am here with the witness, Michael T. Harrelson.

And also present is Timothy Gage of Comcast Cable Communications, as well.

And you need the address? It's currently at 600 Galleria Parkway, Atlanta, Georgia 30339.

MR. BUTLER: And, John, is that your -- I'm sorry, but I was of the impression you were with the Davis Wright Law Firm. Is that right, or not?

MR. SEIVER: I am.

MR. BUTLER: Okay. Just, I don't know if you need to note that.

MR. SEIVER: Yeah, mine --

MR. BUTLER: He's with the same law firm as -- John?

MR. SEIVER: It's the same as Maria Brown's at 1919 Pen (phonetic).

(Discussion held off the record.)

MR. O'ROARK: This is De O'Roark with Verizon. First name is spelled D-e, last name is O-'-R-o-a-r-k. I'm an attorney. The address is 5055 Northpoint Parkway, Alpharetta, Georgia 30022.

COURT REPORTER: And your telephone, please?

MR. O'ROARK: (678)259-1449.

MR. WILLIS: This is Lee L. Willis of Ausley and McMullen, Post office Box 391, Tallahassee, Florida. It's 227 South Calhoun Street, Tallahassee, Florida 32301. My telephone number is (850)425-5487. I am an attorney representing Tampa Electric Company.

COURT REPORTER: Thank you.

Anyone else?

MR. BADDERS: Yeah. This is Russell Badders,

B-a-d-d-e-r-s, with the law firm Beggs & Lane, B-e-g-g-s and Lane. Our address is 501 Commendencia Street, Pensacola, Florida 32501.

Phone number is (850)432-2451. And I'm an attorney representing Gulf Power Company.

COURT REPORTER: Thank you.

MR. TEITZMAN: This is Adam Teitzman, spelled T-e-i-t-z-m-a-n, and I'm joined with Rick Mann. Our address is 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399. Phone number (850)413-6175. And we are attorneys with the Florida Public Service Commission.

COURT REPORTER: Thank you.

MR. CAMPBELL: This is Russ Campbell of Balch & Bingham, LLP, representing Gulf Power Company. And, Ms. Sullivan, I e-mailed to your e-mail address you provided us this morning my contact information.

COURT REPORTER: Okay. Thank you.

Anyone else?

MR. HATCH: This is Tracy Hatch, with AT&T Florida. My address is 150 South Monroe Street, Tallahassee, Florida 32301. My phone number is (850)425-6360.

MS. MASTERTON: This is Susan Masterton, M-a-s-t-e-r-t-o-n. I'm an attorney with Embarq, E-m-b-a-r-q. My address is 1313 Blair, B-l-a-i-r, Stone, S-t-o-n-e, Road, Tallahassee, 32301. My

phone number is (850)599-1560.

COURT REPORTER: You are representing?

MS. MASTERTON: Embarq.

COURT REPORTER: Okay. Thanks.

Who else?

MS. SMITH: This is Natalie Smith. I am also counsel for Florida Power and Light, along with Mr. Butler. My address is 215 South Monroe Street, Suite 810, Tallahassee. Phone number (850)521-3920.

COURT REPORTER: Thank you.

Anyone else? Is that all of us?

MR. BUTLER: Okay. Well, we have here, with the Court Reporter, John Butler. She already has my address information. I represent Florida Power and Light Company.

Also attending here are Dave Bromley and Bob Valdes of FPL.

Sounds like somebody just joined.

MS. KAY: Hi. It's Jennifer Kay with AT&T Florida. Sorry I'm late.

COURT REPORTER: Same address as we took earlier?

MR. BUTLER: I don't think so.

Jennifer, the Court Reporter is wanting

addresses. You're not in Tallahassee; you're in Miami? Right?

MS. KAY: I'm in Miami, yeah.

MR. BUTLER: Would you just give your address, please?

MS. KAY: Sure. 150 West Flagler Street, Suite 1910, Miami, Florida 33130.

(Discussion held off the record.)

- - -

Thereupon,

MICKEY HARRELSON,

having been first duly sworn or affirmed, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BUTLER:

Q. I, as you know, John Butler, representing Florida Power and Light Company, will be asking you questions initially. I know this deposition has been cross-noticed, so you'll probably get some questions from others later, but for now it will be me.

You've had your deposition taken before, I assume?

A. I have.

Q. Okay. So you are familiar, generally, with the process?

A. Yes.

Q. Okay. The one rule I will note -- well, first of all, I will just tell you that whenever you want to take a break, you know, just let me know, and I will certainly be happy to accommodate you. I would appreciate it if there is a question pending, unless it's something where there is a privilege or a

confidentiality issue that you need to talk to your attorney about, that you would answer a question before taking a break. But other than that, you can certainly feel free to say whenever you need one.

A. Okay.

Q. And just, also, I want to make clear to you that, you know, if you have any questions about -- or any concerns or uncertain what my question is getting at, want me to clarify it, please ask me to do so. If you don't, I will assume that you understood the question.

A. Right. Yes.

Q. All right.

Okay. Let's start some with your background, Mr. Harrelson. You have a copy, I assume, of your September 7 direct testimony available to you?

A. Yes, I do.

Q. Okay. And what, if any other, documents do

you have present with you, besides your testimony and exhibits that you filed?

A. Mr. Butler, I have a copy of the KEMA report, I have a copy of FPL answers to staff interrogatories, I have a copy of FPL answers to FCTA interrogatories, I have a copy of Mr. Miranda's rebuttal testimony, a copy of Mr. McEvoy's rebuttal testimony, a copy of Mr. Haines with TECO rebuttal testimony. Let me look. I have a copy of Mr. Miranda's written testimony, and a copy of FCTA answers to FPL interrogatories. I also have a copy of the 2007 NESC.

(Discussion held off the record.)

MR. BUTLER: NE, as in National Electrical Safety Code.

BY MR. BUTLER:

Q. Okay. Thank you, Mr. Harrelson.

A. And I have what is left of a bagel.

Q. I don't think we'll be asking you for that.

And, Mr. Harrelson, would you turn to Page 2 of your testimony, and I'm looking at the answer that starts on line 23. You talk about your qualifications, having been qualified as an expert in several -- I guess five different fields.

Can you summarize what expert testimony you've given on each of those areas?

A. I'm sorry; could you redirect me to that page and line number?

Q. Page 2, line 23 is where the answer starts.

A. Yes, sir. The National Electrical Safety Code requirements I've been involved in -- well, I have a list of testimonies attached as an exhibit somewhere, but I've testified at the Federal Communications Commission. I've submitted written testimony to the Arkansas Public Service Commission. I've submitted written testimony to the Louisiana Public Service Commission. I've submitted various comments to the Florida Public Service Commission -- Florida Public Service Commission in this proceeding. I've also testified in a number of civil lawsuits over a period of the last 15 years.

Some of those civil lawsuits and the FCC and the various public service commission testimonies also involved topic number two, electric power line distribution, design, construction, engineering, operation and maintenance procedures. Some of the civil lawsuits did, as well.

And item number three, joint use of utility poles, there's been a little bit of that involved in some of the civil litigation, but primarily, that's been involved in the testimonies at the FCC and the various

state public service commission testimonies.

Also, I was involved in a case in Utah with a state public service commission in Utah, and I testified there, as well.

Q. Okay. In fact, you mentioned that case a little further on Page 3, line 5 of your testimony; correct? Is that the one you're referring to?

A. That's correct, yes.

Q. Can you tell me a little bit more about what that proceeding involved?

A. That proceeding, as best I can recall details right now, my emphasis was on actually looking at poles that had alleged violations of the National Electric Safety Code and of the electric company's attachment standards. And, also, there was a big question of unauthorized attachments, attachments that were not documented by a paper copy of a attachment permit. Those were the main issues that I was involved in within that case.

Q. Did that testimony involve testifying about the impact of attachments on pole strength?

A. It did not.

Q. Okay. How about whether clearance requirements were satisfied by the attachments?

A. Separation requirements on the pole, yes.

Q. Have you ever testified on -- prior to this proceeding, on issues involving the effective attachments on pole strength calculations?

A. I don't recall any specific instance, unless it was -- well, I can tell you I do, in relation to some of the civil suits, the connection would have been improper guying, improper support of poles, improper placement of poles near -- or alleged improper placement of poles near roadways. But it was that relationship to the strength of the poles; it was not wind loading.

Q. Okay. Have you ever testified before, Mr. Harrelson -- and before, I mean before your involvement at -- I know there has been several levels of the storm hardening issues here with the Florida Public Service Commission. But before this process, have you ever testified on the subject of the appropriate way to storm harden electric distribution systems?

A. Only to the extent of complying with the National Electric Safety Code, never involved exceeding the requirements of the National Electrical Safety Code.

Q. Okay. Would you turn to Page 4 of your testimony, please.

A. I'm there.

Q. Okay. You testify on -- starting on line 14,

that you worked in South Florida for an electrical -- or electrical cooperative in restoration of service after Hurricanes Gene, Francis, Charlie and Wilma.

What electric co-op was that?

A. Glades Electric Cooperative in Moore Haven, Florida.

Q. And can you describe what sort of work you did for Glades Electric Co-op in connection with restoring service after those hurricanes?

A. I did some support of the operations control center and facilitated communications with the management team that was in the control center. The bulk of my work was with field supervision and coordination of contractor crews that had been brought in to assist.

Some of it was -- was with identifying priorities in the field that needed additional resources to recover from the damage during the storm, so I had mobile communications, I had transportation in the field, and I had contact with the control center and with the field construction crew. So I had worked for a number of years as a consultant for Glades and for a six-month period of time as an interim manager of engineering for Glades Electric Co-op. So with my familiarity of their system, their personnel and the

Hearing Exhibit - 000880

contractors that were brought in, I was just sort of an additional coordinator of the recovery effort.

Q. Okay. Were you involved in doing any forensic investigation of the cause of damage to Glades Electric Co-op's facilities during those hurricanes?

A. I think the best way to answer that question is to say that, only on a nonformal basis, I did look and observe. I did not do extensive documentation or write reports of the forensic analysis. It was just field observations and connecting that to my experience that I gave verbal summaries of, I thought, what would be appropriate response in preparation for future storms.

Q. Did Glades Electric Co-op perform any forensic analyses itself of the damage from those hurricanes?

A. It was almost like has been stated by most of the veterans (phonetic) in this rule-making prior to FPL's forensic analysis in Katrina and Wilma. It was done with every resource available made toward restoration effort, and the forensic was more observational and after the fact, so it was not detailed and formal forensic evaluation. It was just observations that were later summarized, but not formal.

Q. Was there a meeting that you participated in or some sort of communication you participated in where

Glades Electric personnel and you discussed the subject of, you know, the causes of hurricane damage to their system?

A. There were follow-up meetings that I recall. I don't recall receiving any documentation from those follow-up meetings.

Q. Okay. Do you recall what conclusions were reached in the meetings, if any, about what the causes -- sort of relative proportion of causes of damage were to the system?

A. Not with any specificity. I do know there was a number of failures caused by trees. A lot of cascading was observed in open areas. There were intense areas of damage, especially associated with Wilma. And a lot of poles fell in one direction, and then would start falling in the other direction in near proximity. So it indicated to us, at least, that there was intense winds in different directions at different times during the storm.

Q. And from your knowledge of hurricanes, that's something that could occur as a consequence of an eye passing over an area, where you would initially get winds from one direction, and then after the eye passes, you get winds from another direction?

A. I think so. It would have to be a very

compact eye or segment of the eye. But, yeah, I'm speaking of one pole one way, and then the very next pole might be standing, and the one beyond it would be a series of poles falling in the other direction. So if it was a eye of a hurricane effect, it would be almost a hundred feet across.

Q. Now, did you also observe in the damage

following these hurricanes to the Glades Electric Co-op system cascading pole failures, where all the poles fell in one direction?

A. We did, both failures where the poles broke and failures where the soil was soft or maybe made even softer by the additional rainfall. But we had some poles that just leaned all the way over and failed, had some leaned but wouldn't be considered failing, and then we had a number -- a significant number of broken poles, where the poles actually broke.

Q. Okay. Now, in the same paragraph we've been talking about toward the end of lines 20 and 21, you have a sentence, "The greatest numbers of power outages were caused by tree limbs and broken wires, not broken poles."

Do you see that?

A. Yes.

Q. Okay. Of the instances where poles broke, do

you have any statistics, or did Glades collect any statistics on the relative proportions of the causes for those broken poles?

A. No, it was anecdotal, not documented.

Q. Well, anecdotally, what was your conclusion or Glades' conclusion, if they were the ones telling you about it, as to the causes of the broken poles?

MR. SEIVER: Objection as to form.

You can answer the question, if you can.

THE WITNESS: They fell -- I think they fell into maybe two or three different categories.

Where there was intense damage, there were solid, sound poles failed in cascading events, predominantly straight-line poles with no additional guying, no pull-offs, no angles. The cascading would stop when it got to an angle pole where it was guyed. The cascading would stop where it got to a pull-off line that was guyed, provided additional strength to that straight-line, nonsupported section of poles.

They were usually associated with areas near cane fields or cattle pastures or along US Highway 27, where there was no trees nearby to, in my opinion, help shelter the line from the direct effect of the winds.

The leaning pole failures, there was a number of them where the line was along the edge of irrigation or drainage ditches with soft soil. And some of those poles actually failed in more than one hurricane, because the soil was so soft, and they were just in an area that was not very strong foundations to the pole.

The others were isolated ones- and twos-type failures. Almost all of them were associated with large tree branches and some large trees, including live oak trees around Okeechobee County -- Okeechobee, Florida, live oak trees really throughout the area.

But some of the hurricanes that impacted the northern part of Glades territory came through

Okeechobee County and Highlands County.
BY MR. BUTLER:
Q. Do you have a sense of approximately what percentage of the broken poles suffered by Glades Electric Co-op were associated with this cascading failure phenomenon you're talking about, versus the ones or twos failures you just mentioned that, in many instances, where there's also trees falling on them?
MR. SEIVER: Objection as to form.
Answer, if you can.

THE WITNESS: I could -- it would have to be a broad estimate if you would like for me to make such an estimate.
BY MR. BUTLER:
Q. Yeah. I realize you probably can't be real specific, but if you have a broad estimate, I would like that.
A. My feeling is in Wilma, in particular, where the most pole breaks happened, it was at least 50 percent cascading, perhaps more.
Q. And, again, those were, in at least most instances, out in -- as you described it, sort of open areas like cane fields, where there wouldn't have been trees near them; is that right?
A. That's correct. It was a combination of open areas and areas where there was no additional side guying because of lateral lines that serve consumers of one type or another. It was just straight-line poles, with no lateral support added, but also related to open

areas.

Q. Okay. Other than your work with Glades Electric Co-op, have you had any other involvement in storm restoration efforts of electric utilities in Florida?

A. Not recent. I don't recall if I'd been to

Florida when I worked with Georgia Power Company. I don't recall going to a Florida hurricane, even with Georgia Power Company. The other experience would simply be my own curiosity in traveling, either after one of those four hurricanes, driving back to Georgia, generally up US Highway 27.

I did go over and observe some damage to around where Charlie made its impact on US Highway 17 and Interstate 95, but that was just drive-by observations on my part. I was curious.

Q. That probably would have been Interstate 75; wouldn't it?

A. You're correct; it was Interstate -- I stopped for a minute and thought it was the wrong one. I'm sorry.

Q. All right. What observations, if any, did you make as a result of your personal excursions into the hurricane areas?

A. There was a narrow path of destruction associated with Hurricane Charlie. It was a pretty intense storm, with a small eye, and didn't cover a large geographical area, but especially along Peace River Co-op's territory, over around Arcadia, Florida.

24 And where it made landfall, I'm not sure if
25 that was your system or what there at Punta Gorda.

1 There was intense damage by Charlie, but in a narrow
2 corridor. And the damage was also very visible on
3 US Highway 27, where it crossed around, I believe,
4 Lake Wales.
5 Q. Did you see the same phenomena of cascading
6 pole failures that we talked about a few minutes ago?
7 A. No, I don't think I was there in that timely
8 manner when the damage hadn't already been addressed, or
9 partially restored, at least.
10 Q. And were you seeing damage from
11 Hurricane Charlie on -- I think you mentioned the area
12 around Highway 27 -- were you seeing it in that
13 vicinity?
14 A. Arcadia, Florida, yes.
15 Q. Yeah.
16 A. Well, Highway 27 -- I'm sorry -- that's
17 Lake Wales vicinity. Yes.
18 Q. Okay. In the Arcadia and Lake Wales areas you
19 were seeing damage from it?
20 A. Right. But Arcadia is on US Highway 17.
21 Q. Right. Okay. As I recall, it's maybe 20
22 miles west of 27; isn't it?
23 A. I'm not sure. It's definitely west of 27.
24 Q. Okay. Do you have any rough sense of how far
25 inland Arcadia and Lake Wales are from the West Coast of

Florida?

A. Well, nothing very close. It would be a guess.

Q. Would you say it's more than 25 miles inland?

A. Arcadia, yeah, I would think so. But Lake Wales, definitely.

Q. Okay. Lake Wales, would you agree it's probably more like 50 miles inland?

MR. SEIVER: Objection to the form.

Go ahead.

THE WITNESS: Guessing again, it would be more than 50, in my guesstimate.

BY MR. BUTLER:

Q. Okay. Mr. Harrelson, would you turn to Page 6 of your testimony, please.

A. Yes. I'm there.

Q. Okay. You are asked to describe, starting at line 10, your assignment from FCTA in this proceeding.

A. Yes.

Q. Can you tell me when you were first contacted by the FCTA to assist in this proceeding?

A. I don't recall specifically, but it was in the first half of '06.

Q. And who contacted you?

A. Michael Gross.

Q. And did you enter into any sort of consulting services agreements with FCTA at that time?

A. Verbal. I'm not -- I don't think there's anything in writing; it was a verbal contract.

Q. All right. And what were the verbal terms of your agreement, as you can recall them?

A. Quite frankly, it was to try to help Michael understand the issues and to evaluate the rule-making process on behalf of Florida Cable Association.

Q. And then has that evolved over time to involve sort of assisting the cable association on other issues, including in this docket?

A. It has anything basically related to the rule-making process that we're talking about today. It's included the different workshops, some meetings with the power company representatives, some meetings with -- in fact, early on, some meetings with the telephone industry, as well.

Q. Okay. How are you compensated for your work for the cable communications association?

A. Hourly.

Q. And what is the hourly rate you're paid?

A. One sixty-five, $165 an hour.

Q. Do you have any sense of how much you have billed the cable telecommunications association since

you began work in 2006?

MR. SEIVER: Objection. This is John Seiver, Madame Reporter.

Are you going to stay on this topic for a while? I'm not sure I'm comfortable -- you know, obviously, his hourly rate and terms are there, but I'm not sure if I want to get into the full details of his billing. You know, he doesn't have any of

those records with him, and I'm just concerned about that.

MR. BUTLER: I don't intend to ask him about the details. I want to know just roughly how much work he's done for the cable television and the telecommunications association.

MR. SEIVER: All right. If you can, Mickey.

THE WITNESS: I really don't know. I mean, I could probably give you a range, but that's about the best I could do. I haven't added them up lately.

MR. BUTLER: Your accountant would be disappointed.

BY MR. BUTLER:

Q. Can you give a -- what range would you say, roughly? It doesn't need to be real precise.

A. I would say it's been more than $50,000.

Q. Okay. If you will look a little bit up the page on the same page of your testimony, you describe your exhibits.

And this Exhibit MTH4 is Dr. Slavin's affidavit. Do you see the reference to that?

A. Yes, I do.

Q. Have you discussed the contents of Dr. Slavin's affidavit with Dr. Slavin?

A. Only briefly when he made the presentation down in Tallahassee, so not in detail.

Q. Have you evaluated any of the supporting documentation to Dr. Slavin's affidavit?

A. Up to a limited extent. I've looked in the code at the strength factors and the load factors.

Q. Have you reviewed Dr. Slavin's testimony that he has filed in this proceeding?

A. I've read it, yes.

Q. Okay. In your opinion, what, if anything, does Dr. Slavin's affidavit attached to your testimony add to the -- substantively to the testimony that Dr. Slavin has filed in this proceeding?

MR. SEIVER: Objection. And, you know, I don't want to have any arguments, but, Mickey, answer that if you can. But, you know, argumentative questions I don't approve of. But

please go ahead and do your best to answer to Mr. Butler's question.

THE WITNESS: And I apologize. Could you repeat the question, Mr. Butler?

BY MR. BUTLER:

Q. I'm just trying to ask, in your opinion, from having read Dr. Slavin's testimony, and then obviously you've read his affidavit that's an exhibit to your testimony, what, if any, subjects are covered or covered differently in the affidavit that's attached to your testimony than how he addresses the subjects in his testimony?

MR. SEIVER: Objection as to form.

THE WITNESS: I haven't tried to determine any differences. I'm not aware of any.

BY MR. BUTLER:

Q. And why did you choose to attach an affidavit of Dr. Slavin, instead of testifying to what is in that affidavit directly yourself?

MR. SEIVER: Objection as to form.

THE WITNESS: It was just a lengthy document, and I wanted to be sure it was included in the record. I did not know he was going to testify, and I did not know his affidavit would be attached in all those other testimonies, either. I wrote my

testimony fairly early on.

BY MR. BUTLER:

Q. Okay. Would you turn to Page 7 of your testimony.

A. Yes, I'm there.

Q. Okay. I'm looking at line 15, where you have a sentence that starts, "Because of quality service objectives and competitive pressures, cable operators must be sure that there are no unreasonable delays in attaching or overlashing cables that would delay provisioning of service to customers."

Do you see that?

A. Yes. Yes.

Q. Are you aware of any delays experienced by members of the FCTA that you would consider unreasonable in attaching or overlashing cables to FPL facilities, since FPL began to implement its storm hardening plan in 2007?

A. I'm not aware of any with FPL's present practice, but that doesn't mean there aren't any. I'm

just answering your question. I'm not aware of any with FPL.

Q. Have you discussed that subject with any of the FCTA members, either before you put your testimony together or afterward?

A. Yes.

Q. And they didn't identify any instances of concerns where they felt they had been unreasonably delayed; is that right?

A. Not to my knowledge or recollection, as it pertains to FPL, if we can assume that the turnaround time will be as prompt as it has in the past; that's correct.

Q. Further down on Page 7 you have a statement that one of your biggest concerns is that all of these costs threaten to go up significantly, due to the company's plan.

Do you see that, starting on line 22?

A. Yes.

Q. Do you have any sense of what percentage of the FCTA members' total operating expenses for their operations in Florida payments to FPL represent?

MR. SEIVER: Objection as to form.

THE WITNESS: I do not.

BY MR. BUTLER:

Q. Have you talked to any of the FCTA members about that?

A. No, sir.

Q. Okay. What would you consider to be a

significant cost increase in percentage terms?

MR. SEIVER: Objection as to form.

THE WITNESS: I'm assuming you mean significant to the cable operators, not to me personally.

BY MR. BUTLER:

Q. Ha, ha. That's right. Yeah. It would be certainly for me a different answer than for my employer.

A. Right. I don't know. I don't have an answer to that.

Q. Okay. Do you know what the sort of pattern of annual increases in the pole rental costs have been for renting pole space in FPL service territory over, say, the last five years?

MR. SEIVER: Objection as to form.

THE WITNESS: No, sir, I don't know.

MR. BUTLER: John?

MR. SEIVER: Yeah.

MR. BUTLER: I would appreciate it, if you have a concern with the form of my questions, to be a little bit more specific, because, frankly, I'm trying to be pretty neutral in these, and I'm not trying to assume facts in evidence. Or, otherwise, if you feel that I'm violating rules, I would appreciate it if you would be more explicit.

MR. SEIVER: Well, I'm sorry. It's just if you have a compound question or where it's a vague or ambiguous term, I don't want to have you say that I'm cluing the witness in, so let him try to answer it as best he can.

When you asked about the costs, you know, there's pole rent, there's make-ready that they pay, there's, you know, other costs and --

MR. BUTLER: Yeah, I was talking about all of it, just to be clear.

MR. SEIVER: Pardon me?

MR. BUTLER: And I was intending to refer to all types of costs that are paid to FPL.

MR. SEIVER: Right. But if I made that objection, and then Mr. Harrelson made an answer back on that, you know, people could say I was coaching. So I'm just trying to make sure that I preserve it. And I don't have a problem with your style or your format. I'm just trying to preserve that.

MR. BUTLER: Okay.

BY MR. BUTLER:

Q. Do you know, Mr. Harrelson, how much FPL receives in revenues from cable telecommunications firms annually for pole rentals?

A. No, I don't.

Q. Do you know, on average, how much FPL receives in make-ready costs annually from cable telecommunications firms?

A. No, I don't.

Q. Have you asked any of the FCTA members about their payments for either the pole rentals or make-ready costs to FPL, about what the level of those payments are?

A. I don't recall asking. I know I've been involved in some conversations recently that had some reference to pole rental and possible escalation of pole rental, and I've been involved in some conversations about the possible increases -- percentage increases and make-ready costs.

Q. How about percentage increases in pole rental costs, have you been involved in conversations about that?

A. Yes, and I'm not sure that it was expressed in percentage. If you would like to tell me, I think I know a dollar amount that might increase.

Q. And what would that be?

A. I believe the statement was made that the pole rental rate might increase by as much as a dollar over the three-year plan period.

Q. And where did that information come from?

A. I think it came from you to the FCTA, or to their attorneys.

Q. Okay. Any other discussions of the pole rental rate?

A. That sums it up very well. I mean, it was discussed. One of the cost questions was: What will be the impact or what might be the impact on pole rental

rates over time?

Q. Would you consider a dollar-per-pole-per-year rental rate increase to be a significant cost increase?

MR. SEIVER: Objection as to form.

Go ahead.

THE WITNESS: I would consider it significant, but I have not discussed it in any detail with any of the operators.

BY MR. BUTLER:

Q. Do you know how much they are paying currently as a per-pole annual rate?

MR. SEIVER: Objection, asked and -- oh, as an annual rate? I'm sorry.

THE WITNESS: I don't know the amount. I can tell you I know it's less than ten; I believe it to be more than nine.

BY MR. BUTLER:

Q. Okay. Now, tell me about the conversations you had concerning possible increase in make-ready costs.

A. Those conversations involved Comcast and Mr. Thomas Carroll (phonetic) somehow, I believe, through channels, Thomas had made inquiries about what increases might be expected for budgeting purposes for make-ready. The question I believe was posed to Alpine, and the response was, perhaps in the range of -- and these figures might not be exactly right -- 15 to 25 percent, 15 percent in urban areas, 25 percent in rural

areas or nonurban areas.

But I don't remember having written notes of that because it was not a firm estimate; it was sort of a ballpark estimate.

Q. And just to be clear, this would be -- the estimate was expressed in 15 to 25 percent, meaning on average of 15 to 25 percent increase in make-ready costs for the urban and rural areas?

A. Right. And I'm not sure what all that included, the cost of engineering costs or the cost of engineering and construction that might be required.

The sense was that it was still a very vague number, and it wasn't something that had enough detail

to it to be very useful for evaluation of the cost impact.

Q. Mr. Harrelson, have you reviewed the engineering drawings for the 2007 storm hardening projects that FPL has provided to FCTA?

A. I've looked at those plan sheets and I've reviewed certain ones of them, reviewed some more closely than others.

Q. Have you undertaken any effort to develop a -- an estimate of what the costs for pole transfers and other activities that would be required by FCTA members to accommodate the changes that are reflected on those engineering drawings for the 2007 FPL storm hardening projects?

A. Not in any detail. I've just made some general observations for discussion purposes of the

locations where I observed in the field. I can tell much more from the field construction if a pole is actually relocated. The plan sheets themselves do not specify if the pole will be set back, it's very near the same location or perhaps offset 6 feet further away from curve, or placed 6 feet closer up the line away from the anchors.

Those details are not generally given in the field, but are field decisions that can perhaps be

shared on preconstruction immediately before the construction, or observed after the construction is done, as I did.

Q. Do you know if anyone within the FCTA or individually for FCTA members has tried to make that sort of estimate of the costs to FCTA members associated with the projects in 2007 for which engineering drawings have been provided?

A. I don't know. I have not received any of it.

Q. Okay, sir. Would you turn to Page 10 of your testimony.

A. I'm there.

Q. Okay. On line 6 through 8 you have a statement: "Lastly the company" -- meaning FPL -- "has not fully satisfied its obligation to seek and attempt in good faith to accommodate concerns of third-party attachers, such as FCTA members."

Do you see that?

A. Yes.

Q. Would you please identify, as specifically as

you can, what you feel FPL has done that has not been in good faith with respect to its interactions with members of the FCTA.

A. With the understanding that it does take time to get responses to requests, I've sent a couple of

e-mails on behalf of FCTA to Mr. Eddie Querto (phonetic). And, basically, I've seen and appreciate very much FPL's response generally to those e-mails that FPL made in rebuttal testimony.

And it's -- I guess it's disappointing to me that it's such a slow process to get questions provided, answers in return. There's been a positive atmosphere, there's been a spirit of willingness to address concerns, but the results are not yet there.

Q. Okay.

A. And I'm sorry; did you -- you wanted some specific examples?

Q. Yeah. I mean, if that's -- if you have anything more specific than that, yes.

A. Right. I had sent along with Eddie some excerpts from the National Electric Safety Code handbook, referring to the guying effects of pull-off lines and guy wires on poles, and had requested that he forward those to the appropriate people, which I'm sure he did.

And, you know, as this process goes, I am glad to see that they have been looked at. And I would like very much to follow up on a discussion of how to incorporate those or to consider incorporating those

into the engineering process.

Q. And do you consider that the response to date -- recognizing it's still ongoing -- but that the response to date has not been in good faith?

A. No, I'm not saying that at all. It's just agonizingly slow.

Q. Okay. Would you turn to Page 11 of your testimony.

A. Yes.

Q. I want to talk a little bit about the equivalent wind strength discussion you have here.

A. Yes.

Q. You mention that, Grade B design results in at least an equivalent wind strength of approximately 116 miles per hour.

Do you see that referenced?

A. Yes.

Q. Are you familiar with the system of categorizing hurricanes by wind strength, the Saffer-Simpson scale?

A. I watch the weather channel a lot. I couldn't quote you the break points, but yes.

Q. So do you know what the -- do you know what category of hurricane would have wind speeds of 116 miles per hour?

A. I'm not certain.

Q. Okay. Would you accept, subject to check,

that the Category 3 hurricane, the wind speed range is 111 to 130 miles an hour?

A. That sounds very reasonable.

Q. Okay. And if that's right, would you agree that 116 miles an hour would represent a weak Category 3 hurricane?

A. I agree with that statement.

Q. Now, if you would, please, turn over to Page 14 your testimony.

THE WITNESS: John, I don't know if it's appropriate, and either one of you fellows can tell me. I'd like to make an additional comment to that that you just asked, but I don't know if it's appropriate or not.

BY MR. BUTLER:

Q. If you want to expand your answer, you're free to do so.

A. Okay. If the wind speed is, say, 120 miles an hour, and the design wind of the line is 116, there's enough safety factors in there that you would not expect the line to start falling at 117 miles per hour. There's a lot of safety factors built into the 116 number.

But once you get maybe 30 or 40 percent above

the force that's associated with the 116-mile-per-hour design, then some of those structures that were designed only to meet, but not exceed, 116 miles per hour might begin to fail.

If trees start falling, then everything is

irrelevant, because the lines are not designed for the trees to fall on them.

Q. Well, actually, your elaboration leads to a question that I had for you, but let me get to it this way by starting you over on Page 14 of your testimony. Keep your finger on 11, because we're going to go back there.

But you will see that there is a reference to the light loading district, NESC wind pressure loading expectation of 9 pounds of pressure.

Do you see that on line 14 and 15?

A. Yes.

Q. And then there's a statement that that's equivalent to winds of up to 60 miles per hour?

A. That's correct.

Q. Okay. Now, help me to understand how do you get from the 60 miles per hour, 9 pounds of pressure equivalents, to the equivalent wind strength of 116 miles per hour for Grade B design. That's what we were just discussing back on Page 11.

A. Okay. The National Electric Safety Code has several different classes of strength specified. It specifies not only Grade C and Grade B; it specifies Grade C at crossings; it specifies Grade N; it specifies extreme wind load applied to Grade C, whichever of the subgrades you're talking about; and it also has extreme wind applied to Grade B.

So with each of these different grades, whether it's Grade C, Grade C at crossing, Grade B, the

code specifies different safety factors to be multiplied first by the forces applied to the pole, and the safety factors even differ between wind force and tension applied by lines.

So the code's got a lot of little multipliers that you have to multiply by the force. But at 60 miles per hour, you start out with a 9-pounds-per-square-foot force, and that force is what's the result, approximately, of a 60-mile-per-hour wind, 9 pounds per square foot.

For Grade C, you multiply the 9 pounds by different factors to get the required strength. For Grade C at crossing, it's still different factors. And it's different factors, depending on whether it's the force of the wind or the force of a wire pulled off.

So it's not a simple answer, but that's

engineering, and that's particularly National Electric Safety Code -- National Electric Safety Code. It's a little intricate to work through those formulas.

Q. Okay. But the equivalent wind strength of 116 miles an hour that you quote on Page 11, line 6, that's basically taking the sort of baseline design pressure, 9 pounds that represents a 60-mile-an-hour wind, and adjusting it upward for a safety factor that then yields this 116-mile-per-hour equivalent wind strength; is that right?

A. Yeah. There's two factors involved. One is a strength factor, and the other is the load factor. The code specifies two different multipliers. One is

greater than one; the other actually goes on the bottom of the equation. It's less than one. And the result is a number which, in my opinion, should be expressed in pounds or force, rather than miles per hour, because it gets too confusing.

The reason I did that is because TECO did it that way; Gulf did it that way. Dr. Slavin tried to explain it in that manner, that if you try to equate 60-miles-per-hour wind to the extreme wind formula, you really are comparing two different formulas.

So it's of some use, provided you still understand why, to compare wind speed, if it were

calculated the same way that the formula for extreme wind is calculated.

Q. Okay.

A. I hope that helps.

Q. I think it does. But what I was trying to ask you is that the 116 miles an hour is essentially the result of doing, I guess, mathematical calculations that take into account the two types of safety factor that you just described, the strength and the load factors; is that right?

A. That's right. And then trying to relate it back to a wind speed, which is really misleading. It would be better if we all talked in terms of pounds of force.

Q. Okay. But if you stay with this wind speed, as you expressed it, would you agree that the 116 miles per hour takes into account the two types of safety

factors that you just described?

A. It does, yes.

Q. Okay. Let me ask you to turn to Page 12 of your testimony, then.

A. Okay. I'm there.

Q. All right. Line 11, you have a sentence that, "The plan," referring to FPL's Storm Hardening Plan, "is applied not only to all of FPL's coastal service

territory, but also to its entire inland service territory."

Do you see that?

A. Yes.

Q. Would you agree that FPL's plan divides the system up into three distinct wind zones for applying the EWL standards?

A. I'm sorry; you're break up, and I'm not sure I understood the --

Q. Let me just repeat the question, then.

A. Please.

(Discussion held off the record.)

BY MR. BUTLER:

Q. The question is whether you agree that FPL's storm plan divides its service territory up into three separate EWL, or extreme wind-loading zones, for the purpose of calculating what sort of hardening activities need to be undertaken on the facilities in those zones.

A. Yes, I agree that that's the approach taken, yes, I agree.

Q. And would you agree that the three -- the

three wind zones or -- the wind speeds that are used for those three zones are 105 miles per hour, 130 miles per hour, and 145 miles per hour?

A. Yes.

Q. Okay. And would you agree that the sort of -- particularly the northern inland area, the zone that covers that part of FPL's service territory would be the 105-mile-per-hour extreme wind load speed?

A. Yes.

Q. Okay. Do you have a sense of how much more force one would be designing for at 145-mile-per-hour assumed wind speed versus 105-mile-per-hour wind speed?

A. I'm not sure I can answer that specifically. I have a sense, but I can't tell you the exact amount.

Q. Well, would it be your sense that the wind -- the wind forces would go up roughly with the square of the wind velocity?

A. Yeah, the forces, the direct forces do increase proportional to the square of the wind speed.

Q. And just looking at that part, would you agree that the forces for 145 miles per hour would be just a little less than twice as much as the forces at 105 miles per hour?

A. I think that's possible for that component of the loading on the pole, yes.

Q. If you look further down on Page 12, you have a comparison of the cost for the TECO storm hardening plan versus FPL's storm hardening plan?

A. Yes.

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Q. Have you evaluated the differences in size between the FPL and the TECO systems? Do you have any statistics available to you on those differences?

A. I have not evaluated them in any detail, no.

Q. Did you review Mr. Miranda's testimony on that point where he calculated that the difference in service territory size was about a factor of 14?

A. Yeah, I did. Yes, I did.

Q. Do you have any reason to disagree with that statistic?

A. No, and I don't -- you know, I don't know that pole density or anything like that is correlated to square miles of service territory. But, no, the answer is, no.

Q. Uh-huh. I'm going to ask you to assume that two systems had essentially the same level of activity of storm hardening in them, and one was 14 times as large as the other. Would it seem to you that the 14-times-larger system, if it spent only five times as much on storm hardening activities, would that seem like an excessive amount to you?

MR. SEIVER: Objection as to form.

THE WITNESS: I don't think I can make a comparison because I don't -- I don't know what the density per square mile of anything is, customers

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or facilities. But I don't know.

Hearing Exhibit - 000908

BY MR. BUTLER:

Q. Well, you would agree that it would be almost surprising if it didn't cost more to storm-harden a system 14 times larger; wouldn't you?

MR. SEIVER: Objection as to the term, "almost surprising."

Go ahead.

THE WITNESS: The only answer I would like to make to that is I'm very familiar with the rural electric cooperatives, and their low density is very small compared to the miles -- square miles of service territory. So I think the comparison would not be particularly useful, comparing expenditures based on square miles of territory.

BY MR. BUTLER:

Q. Do you know how the density of TECO's system compares to FPL's?

A. I don't know.

Q. Later on Page 12 you have a figure about the cost differential of a Grade B wood pole versus an EWL concrete pole.

Do you see that on line 21 through 23?

A. Yes.

Q. And you quote a figure of $8,000 per pole?

A. Yes.

Q. Do you know what the difference in cost between a Grade B wood pole and the class of wood pole that would be used for EWL hardening would be?

A. I'm sorry; the phone is breaking up a little

Hearing Exhibit - 000909

bit.

Q. Sorry. Do you have a figure on the cost differential between a Grade B wood pole and the class of wood pole that would be used for EWL hardening?

A. Just the bare cost of the wood only?

Q. Yeah, the counterpart to the cost differential you're quoting here for the Grade B wood pole versus an EWL concrete pole, I'm just asking if you know what the cost differential would be for a Grade B wood pole versus an EWL wood pole.

A. No. I've been told that the cost escalates approximately 15 percent per grade of pole. I was told that by a wood pole manufacturer. So if you went up two pole classes, for instance, you would expect to go up about 30 percent on the cost of the bare pole.

I believe the costs quoted by FPL in their answers to interrogatories include much more than just the costs of the bare pole. It's the installed cost that they're referring to.

Q. Well, do you have a figure on what the

difference in the installed cost of the --

A. No, I would rely on the answers FPL gave to the interrogatories, to the extent they gave the details you're asking about. I don't think they gave the cost of a Class B pole installed.

Q. Okay. Turn over to Page 13, please.

A. I'm there.

Q. Okay. You have commented on the fact that FPL doesn't have enough information yet to make a

fully-precise estimate of what its -- the benefits from hardening are going to be.

And I want to ask you, philosophically, whether, in your view, it is appropriate to wait and not harden until enough information is collected to know the benefits of hardening precisely, or is it better to move forward with hardening, recognizing that more information about its benefits will have to be developed later. Do you have a philosophical choice between those two directions?

A. Yeah.

MR. SEIVER: Yeah, I have to object, and it's not really your fault, but it was breaking up towards the end there, John. And all we heard was philosophical -- something about philosophical at the end.

MR. BUTLER: Okay. Let me just ask; I'm curious: Are other people on the phone having problems hearing my questions? Is it breaking up for you?

MS. KAY: This is Jennifer. I'm not having problems. It's not breaking up.

MR. O'ROARK: This is De O'Roark. I'm hearing you fine.

MS. SMITH: This is Natalie. I'm hearing you fine.

UNIDENTIFIED SPEAKER: I'm hearing you fine, as well. This is Luke.

MR. WILLIS: This is Willis. I'm hearing you

fine.

MR. BUTLER: I'm wondering, John, whether maybe, with your speaker phone, if there's any sound in the background that the microphone is flipping over.

MR. SEIVER: I would have thought that, but it's quiet here, and it's not consistent. It's just -- I mean, I thought I heard somebody clearing their throat. I thought maybe it was somebody there, but...

MR. TEITZMAN: This is Adam Teitzman with staff. We are experiencing some breakup during the

questions.

MR. BUTLER: Okay. Well, I'll just keep working forward with it. If everybody was having it, I was going to see about getting another phone, but it seems like it's just not something we're likely to solve by changing the phone here.

MR. HATCH: Hey, John --

MR. BUTLER: Before I -- let me -- I'm sorry?

MR. HATCH: John, this is Tracy. It might be helpful if everybody that isn't directly involved puts their phone on mute, because that creates a lot of problems periodically.

MR. BUTLER: That's a good point.

BY MR. BUTLER:

Q. Okay. Let me repeat the question, then. What I'm asking you about is whether you have a preference philosophically, you know, in the presence of a current

incomplete knowledge about the benefits of storm hardening for FPL, to wait and not storm harden until it collects more information about those benefits, or to proceed with storm hardening, recognizing that it is going to have to develop additional data on, you know, the appropriate manner and extent of the hardening as it goes forward?

MR. SEIVER: Objection as to form.

You can answer, if you can.

THE WITNESS: What I have stated, and it's my belief, that it's practical and cost effective, worthwhile, to harden the interstate crossings part of FPL's plan, that the pilot project approach is the preferred method.

I have stated that FPL has done a tremendous amount of good work in engineering guidelines. And it's my believe that, if they would differentiate or focus the pilot projects on areas that are open areas, open areas near the coast, open areas not so near the coast, and refrain from placing the big, expensive lines underneath tall trees that are very likely to cause greater damage than the benefit to be gained, if they would do those adjustments, then I think, based on the judgment of the Florida Public Service Commission, if the expenditure, in their judgment, is worth the expense, then I would withdraw my objections to applying it on a large-scale basis.

But I do believe it should still be done on

pilot project basis with enough of instrumentation to gather good scientific data on the value and the negative effects of building to extreme wind standards.

(Discussion held off the record.)

MR. BUTLER: I'm sorry; can you repeat the last part of your answer, Mr. Harrelson. I don't think the Court Reporter was able to get it.

(Discussion held off the record.)

BY MR. BUTLER:

Q. Do you know what efforts FPL has in place to attempt to gain additional information in the future about the effectiveness of its hardening projects?

A. No, not in any detail.

Q. Are you familiar with the work that FPL and other utilities are doing with the Public Utilities Research Center, or PURC, at the University of Florida, concerning evaluation of storm hardening issues?

A. I've read about the research that's been identified for follow-up, but that's the extent of my knowledge of it.

Q. Do you have a sense of approximately what percentage of FPL's total distribution system will be hardened by the projects it intends to implement in the first three years of the plan, the 2007 through 2009 time period?

A. I believe I read something to that effect, but I don't recall the percentage.

Q. Well, if it were a small percentage, would you

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agree that that could be, in essence, a form of pilot project that the work, you know, is initially, in the period we're talking about approval for, going to cover only a small percentage of the system, and then one could look at the performance of those projects and evaluate how to proceed from there in the next plan?

MR. SEIVER: Objection as to form. That's a pretty long thing to ask him to agree to. But if you can make each part that -- and agree to what you can, please try.

THE WITNESS: There would have to be some conditions, I think, before I was comfortable with it at all as a pilot project. It seems very large in scope to me to be considered a pilot project.

BY MR. BUTLER:

Q. But you don't know what percentage of FPL's system is actually being hardened in those first three years; is that right?

A. I don't recall. I think I read the number, but I don't recall. I think it was in the answer to some of the interrogatories.

Q. Let me ask you about your comments on FPL's estimate of the net present value of restoration cost savings.

Would you agree that the figures FPL is

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estimating for restoration cost savings are dependent upon what one assumes about frequent -- the future

frequency of storms?

A. In part, yes.

Q. And would you agree that no one presently is able to predict, with any certainty, what the future frequency of storms is going to be?

A. I agree.

Q. If FPL's storm hardening projects resulted in fewer and shorter outages in storm -- or after following storms, would you agree that just the fact that the outages are fewer and shorter would be a benefit to customers, in addition to the reduction in storm cost restorations?

MR. SEIVER: Objection as to form.

If you can put that together in a way that's comfortable...

THE WITNESS: If it met that test of prudent, practical and cost effective, but I personally don't believe it does.

BY MR. BUTLER:

Q. Well, now, what I'm asking is, just looking at the benefits, you know, FPL's interrogatory responses and testimony and what you had discussed here focuses on this calculation of the net present value of restoration

cost savings.

What I'm asking you is whether you would agree that, if FPL's storm hardening projects had the result of reducing the number and the duration of outages following storms, would you see the fact of those reductions, so customers aren't out of power as much, as

being a benefit, in addition to the restoration cost savings that have been calculated?

A. I agree that that would be a benefit, but I think the costs should be reasonable.

Q. Would you turn to Page 16 of your testimony.

MR. SEIVER: John, it's John Seiver. Can I interrupt you? We've been going on the call for about an hour and a half, maybe an hour and ten minutes. I didn't know if you wanted to give an estimate of how much longer you might have, considering we've got three other people that have cross-noticed Mickey.

MR. BUTLER: I probably have an hour of additional questions. Do you want to -- first of all, it's probably a good time for a short break. I mean, we have been going for a while, and if you would like that, I'm certainly happy to accommodate it.

MR. SEIVER: I was just going to say, if

you've got another hour, and then I think we're supposed to start Mr. Haines at 1:00; isn't that right?

MR. BUTLER: Well --

MR. HAINES: Per schedule, yes, John.

MR. SEIVER: I'm wondering -- you know, I don't think I have very much, but I would think the other three -- should we get some kind of an estimate now that maybe we need to delay Mr. Haines?

MR. BUTLER: That's fine with me. Honestly, I'm not planning on actively participating in Mr. Haines' deposition, so it's probably more of an issue of others on the phone than me.

MR. SEIVER: I'm sorry, John, that's what I meant. I was asking for Gulf and TECO and staff who cross-noticed Mickey what they thought they'd be doing today.

MR. CAMPBELL: This is Russ Campbell on behalf of Gulf Power Company, and I would anticipate that I have, you know, approximately an hour or less of questioning. Of course, that's depending on how the witness responds, but that's my projection.

MR. WILLIS: This is Lee Willis for Tampa Electric. Mine is about the same.

MR. TEITZMAN: This is Adam Teitzman with staff. We probably only have 20 to 25 minutes.

MR. SEIVER: And, John, with you still having an hour, that gives me at least three and a half hours of --

MR. BUTLER: Yeah, there's clearly a time problem here. I'm not sure what everyone wants to do about it. I mean, I don't think I'm going to have any problem finishing up before 1 o'clock myself. So, you know, from that narrow perspective, it wouldn't need to change.

But obviously we have these cross-notices and, as I've said before, we're willing to keep the line open and continue it, you know, for the remainder,

but it certainly is going to overlap Mr. Haines.

MR. SEIVER: Well, I was planning on doing Mr. Haines. I didn't know -- I mean, Mr. Harrelson can stay through this afternoon to finish it.

Are other people from Gulf and TECO and staff going to be doing Mr. Haines than those that are on this call?

MR. BADDERS: Gulf is not involved in the Haines deposition.

MR. SEIVER: Oh, that's right.

MR. WILLIS: John Seiver, how much

cross-examination do you have for Haines?

MR. SEIVER: I'm not really sure. It depends on, you know, what the staff does, but I would expect it would be no more than half an hour.

MR. BUTLER: Hey, folks, I'm having to play name recognition expert here for the Court Reporter. Please try to remember to say who you are when you're making statements.

MR. O'ROARK: And this is De O'Roark with Verizon. We've probably got 20 minutes with Mr. Haines.

MR. TEITZMAN: This is Adam Teitzman with the Commission. Another attorney from the Commission will be handling that deposition, so we're okay.

MR. SEIVER: This is John Seiver. Lee, are you still on the call here?

MR. WILLIS: Yes, I am.

MR. SEIVER: Were you going to defend

Mr. Haines?

MR. WILLIS: Yes.

MR. SEIVER: So that would mean we couldn't have this go at the same time Mr. Haines goes; is that correct?

MR. WILLIS: Correct.

MR. BUTLER: Hey, folks, you want to go off the record? I'm not sure we really need all of this on the record; do you?

MR. WILLIS: Let's go off the record. This doesn't make sense to have it on the record.

MR. SEIVER: I'm sorry; we should have suggested that. Okay.

(Discussion held off the record.)

MR. BUTLER: Okay. Can we go back on the record?

MR. SEIVER: Okay. Witness is ready.

MR. BUTLER: Okay. Thank you.

BY MR. BUTLER:

Q. Mr. Harrelson, would you turn to Page 16 of your testimony, if you're not already there.

A. Okay. I'm there.

Q. And lines 23 to 25 --

A. Yes.

Q. -- you say, "Another common cause of wood pole failures is cascading of solid strong poles because an adjacent pole breaks in high wind because of flying debris, rot or other defect."

Are you familiar with circumstances where

cascading has started because of a pole breaking simply because of the wind load on it, as opposed to flying debris, rot or other defect?

A. I believe I am, yes, with a high enough wind speed, yes.

Q. Turn to Page 17, please.

A. I'm there.

Q. Okay. Line 18, your answer -- well, first of all, the question, line 16: "Would application of EWL criteria address all of the wind speed issues FPL is seeking to remedy?"

And then your answer is: "No, tornadoes and micro bursts within hurricanes have winds in excess of extreme wind design speeds which can and frequently do break poles which meet extreme wind criteria."

Do you see that?

A. Yes.

Q. What data do you have or are you -- well, let's just start with what data do you have on the wind speeds associated with tornadoes and micro bursts that occur within hurricanes?

A. Well, I'm not a meteorologist. I've just heard the speeds in tornadoes can get up in excess of 200 miles per hour, and just random facts of that nature.

Q. You've not performed any evaluation or literature survey concerning that issue?

A. I have not. I've read the comments of a

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number of other experts and commenters in the record that have expressed that same opinion.

Q. Okay. But you don't have any -- you don't have any independent basis for it, though; is that true?

A. No, I have some limited observations of what I believe to be that same effect, or resulting from hurricane Wilma, in particular.

Q. But you don't know anything about the wind speeds that occurred within those tornadic or micro burst events that you believe you saw in Hurricane Wilma?

A. That's correct.

Q. Okay. And you don't have any training as a metrologist; is that correct?

A. That's correct.

Q. Okay. Have you evaluated FPL's forensics data on what it concluded were wind only pole failures during Hurricane Wilma?

A. I've reviewed that. I wouldn't say I've extensively evaluated it, but I have reviewed it.

Q. Do you have an opinion as to what percentage of those wind only pole -- I'll get this out -- what percentage of those wind only pole failures were a result of tornadoes or micro bursts?

A. I don't know.

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Q. Turn to Page 18 of your testimony. Sort of a general question about forensics data: Other than FPL's

forensics data on the 2005 storm season, in particular Hurricane Wilma, what other forensics data are you aware of that has been collected formally for the impact of hurricanes on electric distribution systems in Florida?

A. I'm not aware of other formal attempts to collect forensic data on hurricanes.

Q. Okay.

A. There have been, I would like to just say, a lot of comments submitted to the NESC committee, and they've been referenced by other experts more familiar with that process than I am, that commenters had expressed a disagreement with applying strain wind.

Even though the extreme wind application would have been much different if it had passed the NESC committees, it would still -- it would not have applied the forces that have been applied with FPL's methodology, is my understanding.

And those experts' accounts of the consideration that was made in the 2007 code, it still was voted down or -- it didn't pass because of the overwhelming input from industry commenters that said it's not extreme wind effect on poles less than 60 feet that support it.

Q. Do you know if any of those commenters submitted statistically valid, or what you would consider to be statistically valid forensics data on hurricane impacts in connection with their comments to the NESC?

A. I do not.

Q. Have you had any discussions with KEMA concerning the KEMA report?

A. No.

Q. This is sort of the same question, but not quite, because he has moved to a different company: Have you had any discussions with Dr. Brown, Richard Brown, concerning the KEMA report?

A. No, I have not.

Q. Okay. If you turn to Page 20 --

A. I'm there.

Q. -- on line 14 and 15 you have the sentence: "The trees and flying debris can and do frequently break poles designed to EWL standards."

Do you see that?

A. Yes.

Q. What data do you have to support that statement?

A. Just some of my own observations based on what I believe the strength would be of some poles that had

guying -- guying effects, and some poles that were actually designed to extreme wind standards, although they were greater than 60 feet tall, and --

Q. None of it -- I'm sorry. Go ahead.

A. -- just observations I've made in addition to those comments I referred to earlier that other power companies have submitted to the NESC committee.

Q. Well, I guess what I'm really wanting to focus in on is, as you've observed, there aren't very many people building their less-than-60-foot-tall

distribution facilities to EWL standards. So I'm asking you specifically about, you know, what data you have on trees and flying debris breaking poles designed to EWL standards, when the great majority of the systems aren't designed to that standard.

A. I might have been more clear in this sentence here if I had said they were constructed to EWL standards, rather than designed to EWL standards.

A lot of the actual field construction results in a stronger pole than the criteria that was used to design it. In other words, if you put storm guys on a Grade C pole, it might easily meet or exceed extreme wind standards.

So it would be a better statement on my part if I said was designed or constructed to EWL standards.

But, again, the opinion is just based on my observations over a period of time and comments that I've read about that were submitted. And some of the comments, I've actually read the comments submitted to the National Electrical Safety Code Committee.

Q. Okay. Do you have any specific instances you are aware of personally of trees and flying debris breaking poles that were designed to EWL standards?

MR. SEIVER: Objection, asked and answered.

Go ahead.

THE WITNESS: No, I don't have any specific ones.

BY MR. BUTLER:

Q. Okay. Now, going to the constructed, which

was the other part of what you said might be the more precise wording for this statement --

A. Okay.

Q. -- where you have seen poles damaged by or broken by trees or flying debris that you believe may have met EWL standards, even though they weren't designed to it, for any of those poles, have you undertaken an engineering calculation or other evaluation to determine whether the poles, in fact, met the EWL standards?

A. Not specifically, no. Just observations based on my experience.

Q. Okay. Mr. Harrelson, would you agree that, as between the feeder lines and lateral lines, that if one had to prioritize which it is most important to harden, that there would be benefits to prioritizing for feeder lines because those serve more customers, on average, than a lateral line does?

MR. SEIVER: Objection as to form.

THE WITNESS: I would agree that that is a important consideration, and so long as there's balance, so long as the hardening is cost effective, I would agree with that statement, in general.

BY MR. BUTLER:

Q. On Page 21 of your testimony, lines 11 and 12, you talk about Osmose's findings on defective pole rates. Do you see that?

A. Yes.

Q. Do you know whether FPL is addressing the issue of defective poles through its commission-approved pole-inspection program?

A. Yes, I am, and it's my understanding that they have brought their pole inspection schedule up to meet the national standard for Florida, which by the rural utility service, is an eight-year cycle.

Q. You also mention on line 15 that -- I'm sorry -- line 14 and 15 of Page 21, that, "Good maintenance of poles, guy wires and the right-of-way, (i.e., trimming vegetation) together with additional storm guying"..."is the best preventive strategy for cascading failures."

Do you see that?

A. Yes.

Q. Okay. Now, would you agree that FPL's forensics data from Hurricane Wilma identifies pole deterioration as a reason that poles fail, and also identified vegetation or tree impacts as a reason that poles failed?

A. I did, yes.

Q. Then the wind only category of failure would be poles where the inspectors concluded that they didn't find evidence of deterioration and didn't see evidence of trees or other vegetation taking down the pole; would you agree with that?

A. I did conclude that from the KEMA report, together with rebuttal testimony of Mr. McEvoy.

Q. And would you agree that poles that did break

for reasons that did not have to do with tree impacts or deterioration of the poles, that breakage presumably would not be -- not have been avoided simply by programs

that would increase the pole inspection or increase the vegetation management?

A. I'm not sure I completely understood the question, but maybe if you would repeat it for me.

Q. Okay. Or maybe I'll try to reword it so it's a little easier to understand.

What I'm asking you about is that, if a pole failed for the wind only cause, which means it didn't fail because it was impacted by vegetation, it didn't have deterioration in it that would have caused it to fail; for those poles, the wind only poles, would you agree that a more aggressive pole inspection program and a more aggressive vegetation management program would not have likely avoided those pole failures?

A. If the data was perfect, that would be true.

Q. Okay. In fact, it might be true frequently, even if the data was only pretty good; wouldn't it?

MR. SEIVER: Objection as to form.

THE WITNESS: I would agree with that. The one thing we're certainly leaving out of this conversation is the effective guy wires and the possibility of ensuring the guys that are in place are effective, and adding more guy wires, were it possible, to intervene in the cascading process.

I just got the impression that the root cause

of cascading would have been better -- more information gathered about the root cause of cascading would have been helpful. But, again, I don't know for sure.

BY MR. BUTLER:

Q. Is it your understanding that guying of poles is one of the techniques in FPL's so-called tool kit for hardening?

A. Yes, I know it is. And I think it's one of the best tools.

Q. You would encourage FPL to use that where possible; is that right?

A. Yes.

Q. Do you know whether FPL is, in fact, using guying where possible to address the achievement of EWL wind standards?

A. I believe that's their intention, and an effective follow-up program on that will be, I think, even more effective --

Q. Okay.

A. -- verification that the intention is, in fact, applied to the design and construction.

Q. Okay. Turn to Page 24, please.

A. Okay.

Q. I wanted to ask you some about this proposal

you have made for taking into account the guying effects of other power lines, communication cables.

A. Okay.

Q. Now, one thing, just to be clear, I was noticing as I was reading the statement on line 22 and 23, you say, "The deployment deficiency is that the guying effects of other power lines, communications cables and guy wires are not taken into account by FPL..."

How is it that you feel FPL is not taking into account the guying effect of guy wires?

A. I think they're only doing half of the better engineering calculations on the effect of guy wires. I do believe they are checking to see if the guy wires are adequate to counteract to balance the strain that's being applied to the guy wires by the conductors.

They're not taking it to the next level, which is to do a second calculation to determine if the remaining strength above that required by the guy wire to counterbalance the strain of the conductors, they're not checking to see if that is helpful in supporting that pole in the extreme wind, whenever extreme wind or a Grade B wind, either one, is applied in the direction that the guy wire has the support. They're only doing one of the calculations, not both.

Q. So the guy wires you're talking about here are sort of the guys on which the various equipment is attached, not the storm guys; is that right?

A. They are -- right. They are doing the calculation that I alluded to on storm guys, because that's the express purpose of storm guys is to counteract the effect of wind on the poles.

Normal, common guy wires that are put in place to counteract the effect of tension placed on the pole by pull-off lanes, they're only calculating those guy wires for the effect that they have on counteracting that tension.

They're not doing the second calculation and seeing if that guy wire strengthens the pole enough to withstand extreme wind.

Q. Okay. Mr. Harrelson, do you have -- I think you said earlier you do -- do you have a copy of the FCTA responses to FPL's interrogatories?

A. I do.

Q. Would you look at Interrogatory Number 6 and the answer to it. It's on Page 16 of 30 in the --

MR. SEIVER: Please hold on a second, Mr. Butler.

THE WITNESS: We're looking. FCTA answers to FPL, Page 16?

BY MR. BUTLER:

Q. Yeah, it's 16 of 30.

A. All my pages are numbered number one.

What's the interrogatory number, please?

Q. Number 6.

A. And what's the question?

MR. SEIVER: I have it. I've found it.

BY MR. BUTLER:

Q. Okay. So far there's no question. I was just being sure you had it in front of you.

Did you provide this response to the

interrogatory?

A. I did.

Q. Okay. And this is just to make clear on the record, this is FCTA's and your response to a question about how one would actually do a calculation to include the effects of the guying effects of the power lines and communication cables; correct?

A. It is.

Q. Okay. Have you ever presented this calculation to the NESC?

A. No, I have not.

Q. Do you know whether anybody else has presented it to the NESC?

A. No, I don't.

At some point, I'd like to expand on that answer, but go ahead with your line of questioning.

Q. Do you know whether any utility has ever met the NESC's requirements for documenting the effect of their engineering calculations to use this methodology for taking credit for the guying effect of power lines or communication cables?

A. No, I don't. But I disagree with the presumption that the NESC requires that a methodology be explained. The NESC requires where and when extreme wind loading is to be applied. It specifically exempts that requirement from poles with attachments that are less than 60 feet high.

So in an effort by the Florida utilities to extend beyond the requirements of the code, then when

they choose where and when and how it is appropriate to apply extreme wind loading to distribution poles less than 60 feet, they have to also determine where it's prudent, practical and cost effective.

So they're not bound by all the rules that are in the code that apply to where the code requires extreme wind loading.

Beyond that, the code does not require that the methodology be explained. It simply requires that the results be accurate. And it does prescribe the

mathematical formula for applying extreme wind to poles greater than 60 feet in height.

So I differ to a significant degree with the idea that the NESC has to approve a methodology. The methodology can be based on experience, so long as it's effective.

And years ago, which I have enough years to know, we considered these points on the pole to be fixed points. And that was a very effective tool and performed very well for distribution poles, but it's not exactly correct. It was just effective, and it was common within the industry to consider pull-offs with guide attachments on the poles to be fixed points above ground.

Q. All right.

A. I have seen that used by Alabama Power, in particular.

Q. Are you familiar with Mr. McEvoy's comments in his rebuttal testimony about the implementation concerns

he would have about the methodology you're describing in answer to Interrogatory 6?

A. Yes, I have -- yes, I am.

Q. How would you address those concerns?

A. I'm glad to see his comments. I agree with the comments he made about the sag in the line, the

strength of the attachment hardware. Those are details that are available. Those details do need to be checked in a thorough strength assessment or evaluation of construction standards. I agree with all his concerns with the exception that I think the methodology need not be approved by the NESC committee. No -- in fact, it doesn't have to be done by a computer, it doesn't have to be done by a calculator, it can be done longhand. It just has to be a valid method.

Q. But where would one find the valid method to use to put these sort of principles into effect?

A. All right. It is my opinion that, number one, the NESC does not require applying extreme wind criteria to poles less than 60 feet high.

The Florida Public Service Commission has charged the investor on utilities with determining where and if it's prudent, practical and cost effective. So if you're going to apply it, then you also have to have some responsible and cost-effective means of deciding where to apply it and deciding how to evaluate it.

The code does not give you the liberty to decide where the code requires any -- or requires EWL design to say, wait, there are trees near the line, so

I'm going to consider the shielding effects. You do not have that option above 60 feet.

But since you're stepping away from the code requirements, you, together with the Florida Public Service Commission, are inventing a new standard to apply to poles less than 60 feet, if the Public Service Commission has charged you also to be prudent, practical and cost effective.

Q. But as we sit here, you don't have something you can point to that would be the source of the information that answers Mr. McEvoy's questions about applying the methodology?

A. No, not in detail. And I have said I agree with Mr. McEvoy that those details need to be incorporated into the calculations, the strength of the attachments where the wires are attached and even the issue he raises about twisting the pole, the torsion -- torque that's placed on the pole.

If that torque is placed there, it's going to be there, whether it's calculated or not. It's a reality of field construction, and it needs to be taken into consideration. It certainly needs to be factored into the determination of what those guying effects are. But I do believe the problem is not difficult mathematically.

Q. Okay. Mr. Harrelson, would you please turn to Page 29 of your testimony.

Hearing Exhibit - 000935

A. Okay. I'm there.

Q. Okay. Looking at lines 22 and 23, there is a statement by you that, "The company's plan does not yet include enough information about the cost and benefits of its storm hardening plan to enable me to provide a specific estimate of the costs and benefits that the company's plan will have on third-party attachers."

I think we talked about this earlier. You have seen, but not reviewed in detail, the engineering drawings that FPL provided for its 2007 storm hardening projects; is that correct?

A. That's correct.

And, in addition to that, I've seen two projects that have been completed as far as the initial pole work and pole replacement. So I can see better in the field details that are not provided as to the pole location, new poles. They're not provided on the plans, anyway.

Q. Well, what additional information do you feel that you need in order to provide the estimate of costs and benefits that you say you can't provide currently because of lack of information?

A. Well, in years '08 and '09 there are the engineering plans -- engineering plans are a starting point. But a better understanding --

(Discussion held off the record.)

MR. BUTLER: We're talking about a -- just so you understand, we're talking about a plan that

covers 2007, 2008 and 2009, so a reference to '08, '09 is shorthand for that.

(Discussion held off the record.)

BY MR. BUTLER:

Q. And the question, just to make it clear, was: What additional information you feel you would need in order to provide a specific estimate of costs and benefits that the company's plan will have on third-party attachers?

A. To get to the answer, we will need the number of poles that are actually added, the location at which they're added, the number of poles that are actually replaced, and the physical relationship of the replacement pole to the existing pole. Once we get that information, then a determination can be made of the transfer costs and/or facility's replacement costs.

And I think we all understand that that's been addressed in the process -- within a process document. It can be practically worked through.

But to answer the question, we don't have the information, because you don't have the information, and you can't provide it to us until you develop it. And

once you do start providing it, it will become more clear then what additional details the operators would like to have and you might consider providing.

Q. Would you turn to Page 32, please.

A. I'm there.

Q. Okay. At the top of the page you have a comment about FPL not targeting it's EWL plans to open

areas where lines are not sheltered from direct wind effects. Do you see that?

A. Yes.

Q. What data do you have that support the conclusion that pole breakage from wind exposure is more of an issue for poles in open areas?

A. Did you say, "is more of an issue in open areas"?

Q. That's right.

A. My experience is one, the KEMA report is two, and what little bit I do know about the sheltering effects of buildings and wind and buildings and trees slowing down the wind, I think it's almost obvious, but those are what I rely on that open areas have more direct effect from the wind than areas where trees and buildings are taller than whatever the wind is trying to or is having the effect upon.

Q. If FPL were to retain its intention of using

EWL standards for areas that are not open, in other words, that are sheltered, do you have any mechanism by which FPL could -- or mathematically take those sheltering effects into account in its engineering calculations of the required strength for facilities in those sheltered areas?

A. I think the research that has been started at PURC intends to address the tree issue. I know Progress Energy has talked about doing some pilot projects in areas with trees and without trees.

They've also, along with Gulf, talked about

putting up wind speed measuring devices. I believe it would be very useful to put wind speed measuring devices on poles in open areas and poles nearby in forested or tree-sheltered areas. The information could be gathered. It might be already available, but I'm not familiar with it.

The code is not helpful in those aspects, because the code has a clear distinction. Sixty feet is the line where EWL is required above 60. EWL is not required below 60. And the code does not attempt to address the events of open areas, sheltered areas. It just has not undertaken that.

(Discussion held off the record.)

THE WITNESS: Just the clear line at 60 feet,

you have to apply EWL above 60 feet; you don't have to apply it below 60 feet. So the code is not helpful; it's not tried to resolve that question.

BY MR. BUTLER:

Q. And, Mr. Harrelson, on Page 33, line 4 and 5, you have a comment about, "FPL has a range of larger pole sizes because of the EWL hardening plans." You say, "To avoid extreme delays in restoration, FPL will have to stock large quantities of these poles, which are not traditionally available for most pole vendors' inventory."

Do you see that?

A. Yes.

Q. Are you aware that in storm restoration conditions, FPL actually installs what it has available,

and then later goes back to correct the system to whatever the intended strength requirements are?

A. I have some indication that that might be the case, based on some testimony I've read, yes.

Q. Do you have any reason to disagree with that testimony?

A. No, I don't, but I think that's consistent with my concern that it adds expense and time to the full restoration of the system.

Q. How would it add time to the restoration of

the system?

A. Well, if you replace, say, a concrete pole with a wood pole or a Class 2 wood pole with a Class 4 wood pole, you do that under emergency conditions when the lines are de-energized. If you have to come back on a second pass days or weeks later, replace that same pole again with a larger or a concrete pole, you have to typically do that when the lines are energized, when the traffic is flowing, when you have to use all of the precautions and time constraints of working in traffic. It's much more expensive to replace a pole in an energized line under normal conditions than it is to put one back in immediately after a large storm.

And it's just an additional cost. If you had the right sized pole to put in during the storm, then you would at least limit it to that one replacement, not a double replacement.

Q. Okay. Let me ask you about, starting on Page 34 you have a series of bullet items here of what

you believe are prudent, practical and cost effective storm hardening initiatives.

A. Right. Yes.

Q. You see that? Line 13, small conductor replacement, do you know whether FPL has a program for replacing small conductors as part of its storm

hardening plan?

A. I do now. I read it in Mister -- either McEvoy or Miranda's rebuttal testimony. They did not emphasize it or mention it in the storm plan. Progress Energy did mention it. And I think it's a very effective means of storm hardening, so I'm glad to learn now that FPL does have that program.

Q. Okay. The next bullet is about right-of-way, access-improvement projects?

A. Yes.

Q. Is this something that you believe is within a utility's control to bring about?

A. Within reason, there are lots of places where culverts can be added. So, to a limited extent, it certainly is.

Q. But would you agree that there are many other instances in which the utility doesn't have the right or power to implement these sorts of access improvements?

MR. SEIVER: Objection as to form.

You can answer.

THE WITNESS: I agree.

BY MR. BUTLER:

Q. And a third bullet, "Use of specialized

equipment or contractors for work in difficult right-of-way conditions, et cetera," do you know whether

FPL currently uses those sorts of approaches in its storm restoration activities?

A. I do now. I read more about it in rebuttal testimony.

Q. Okay. Excuse me. The next bullet at the top of Page 35, would you agree that FPL has an aggressive pole inspection program approved by the PSC?

A. Yes, I believe that all the Florida investor-owned utilities have brought their pole inspection program up to the national standard. I'm not sure about the emphasis on guy wires at this time.

Q. Okay. That's actually the next bullet; right?

A. No, I said in the -- I'm sorry -- I said in the pole inspection, that guy wire inspection --

Q. Oh, that's right.

A. -- to include opportunities to add strategic guys should be part of the pole inspection program. And frequently it's not, in my experience.

Q. The next bullet is about installation of storm guying projects for line segments where it is feasible. I think we talked about this before.

You agree that storm guying is part of FPL's storm hardening tool kit; wouldn't you?

A. I do.

Q. And do you -- do you have disagreements about

whether FPL is doing storm guying where it is feasible?

A. I have not seen documentation that they are utilizing storm guying short of either extreme wind upgrades or incremental hardening projects. I advocate separate storm guying projects for difficult lines where there's soft soil, where there are long spans in rural areas, and where there's opportunities to strategically use storm guying to intervene in places where cascading problems have occurred in the past.

Q. The next two items, next two bullets talk about basically ways to sectionalize or compartmentalize the distribution system. Do you know whether the absence of or limitations on ability to sectionalize was a problem that affected the -- either caused outages or caused problems in restoring service out of -- after outages in the 2005 storm season?

MR. SEIVER: I have to object to that, John. I'm sorry.

But if you can, Mickey, if you followed it all the way through.

THE WITNESS: I think I can answer. I don't have specific examples, but I have gathered from the plan that FPL is adding such switches near interstate highway crossings as part of their strategy to storm guy those crossings of

interstates. I know they're applying it there to improve sectionalizing, so I assume that improvements in sectionalizing can be made in at least certain parts of this very large system. And

that would be consistent with my experience over the last 35, 40 years.

BY MR. BUTLER:

Q. Okay. Are there specific instances where you think additional sectionalizing should be done that you don't see it being proposed in FPL's plan?

A. Yes, I think on feeder lines and lateral lines there certainly are opportunities, but without looking at some system maps, I would not know specifically. But I think it's well worth investigating. But I read from the rebuttal testimony that FPL does have such programs to address improving that sectionalizing plan.

Q. Have you -- looking at the next bullet concerning conversion from 12 or 13KV to 25KV voltage on distribution systems, have you done any sort of evaluation of the benefits versus the costs of such a conversion?

A. Not personally. I've read some analysis of voltage conversions on distribution systems over the years, especially as relates to the rural electric cooperatives. I'm familiar with the evaluation of the

advantages and disadvantages.

Q. Okay. Do you think this is something that has general application to FPL's system?

A. To part of their territory, I believe it does.

Q. And which part -- I'm sorry -- which part would that be?

A. Any part, such as some I've seen in Okeechobee County out in the agricultural areas, long feeders. If

they're operating at 12KV, then the possibility of upgrading that voltage to 25KV might be the proper choice, rather than installing larger size conductors to provide power to an increased load.

I'm not at all sure that FPL is not utilizing this, but it's just one of the fundamental tools that's available. I wanted to mention it for general application.

Q. Okay. And what about the last bullet, the, "Procedures to avoid cutting of fiber optic cables by debris-clearing electric repair crews," is this something that the FCTA members saw as a problem in FPL's 2004 or 2005 storm restoration activities?

A. I know that it has been a problem in certain places. I don't have dates, times and specific company references to when fiber optic cables were damaged in the restoration and road right-of-way clearing efforts

after major hurricanes. But I have heard a lot of discussion about the fact that this system would be checked out and still functional until the restoration effort got underway, and then the cables got cut either in removing debris from the roadway or getting broken poles out of the path or out of the way to replace broken poles with new poles.

So I know there are opportunities there, in general, to better communicate and better preserve each other's facilities, after these big storms. I'm not certain about any particular problems with FPL.

Q. Okay. Turn to Page 36, please. You have a

section here entitled Third-Party Attachment Standards and Procedures that runs on from 36, I guess, to 45.

A. Yes.

Q. Are any of the concerns and proposals you are addressing in that section something that is occasioned by changes to FPL's attachment standards and procedures it made in order to address and implement the storm hardening plan, as opposed to, you know, procedures and standards that were in place in FPL's attachment standards and procedures before the storm hardening plan?

A. Let me -- maybe I can just say that I don't believe FPL has made changes to the written procedure

that have added any concern. The concern, I believe, is more to the actual implementation going forward of how those written procedures might be interpreted, and, therefore, there's two really big concerns on behalf of the Florida Cable Association about attachment standards and procedures.

A major part of those attachment standards and procedures are FCC jurisdiction, and the other part of them, we don't know how the actual implementation of those written procedures might be adapted to the extreme wind and other inspection requirements in the other documents, such as wood pole inspection and the audits of third-party facilities.

Q. But you would agree that nothing -- for FPL, at least, nothing has changed about how those procedures would be implemented from before FPL proposed its storm

Hearing Exhibit - 000946

hardening plan to when it proposed the storm hardening plan?

MR. SEIVER: Objection. I'm confused, but if you followed that, Mickey.

THE WITNESS: Well, I'm not sure the question was clear.

BY MR. BUTLER:

Q. Okay. Was there any change to the attachment standards and procedures of FPL that you are concerned

about that occurred between the time before FPL had the storm hardening plan proposed, May 7, 2007, and once it had proposed that plan?

A. Not to changes in the written plan. There is concern about the unknown of how the written plan might be applied to the projects, the extreme wind projects to the wood pole inspection docket and to the ten-point initiative plan that required assuring that third-party attachments do not overload the poles.

But the written document, that minor changes have been made by FPL have been beneficial, not of concern.

Q. What part of your written testimony here covers the issue you just mentioned of concern that the way FPL's attachment standards would be implemented could be affected in a way that would be adverse to the FCTA, now that we have our storm hardening plan in place?

A. Well, the calculations themselves are necessarily going to be different about the load that

the cable attachment places or adds to the pole, as well as overlashing of existing. So we're --

Q. The calculations will be different, or the kind of the standard they'll be compared to is going to be different?

A. The standard will be different; therefore, the mathematical calculation will be different to determine the amount of load that's associated with the cable and its overlashing, if that's part of it. So both.

Q. But the way the load is taken into account, are you saying that that has changed?

A. Certainly it's changed, between your existing Grade B construction and your proposed incremental hardening, your distribution guidelines and your pilot projects for -- not pilot projects -- but your critical infrastructure extreme wind loading projects.

Q. And in what sense has the calculation changed?

A. The extreme wind calculation that you and I have already discussed, as Florida Power and Light applies it to poles less than 60 feet, is dramatically different from the calculation to Grade B. And it's a different formula in the National Electric Safety Code that the Florida FPC is using to apply extreme wind design to poles less than 60 feet. It's just totally different from Grade B.

Q. I think you meant FPSC; didn't you, when you just said FPC?

A. I probably meant FPL. I think I meant Florida Power and Light is taking extreme wind. They've

developed new standards, which I've said were a really

good effort to develop standards or general application, your distribution engineering manuals. All those take into account your change in design from Grade B to your three-pronged approach to hardening your system: Extreme wind for one, incremental hardening for another, and the distribution engineering manual for new construction.

Q. Have any of the FCTA members experienced problems so far during 2007 in having their calculations of the impact of new facilities or overlashed facilities taken into account under FPL's new hardening standards?

A. I don't know. The projects I'm aware of, the construction work was done in the field, and the transfers haven't -- the last I was in the field, haven't been done. So I'm not aware; I don't know.

MR. SEIVER: John, would this be a good time to have an update on when you think you might be done with your direct?

MR. BUTLER: Sure. I think what I really want to do is, I've got probably a few more questions here -- more than a few, probably less than ten -- and then I'd like to just put you on hold for a minute and confer to see if there's anything else we want to cover. But we're getting pretty close to finished.

MR. SEIVER: Okay. That sounds good.

BY MR. BUTLER:

Q. Mr. Harrelson?

A. Yes.

Q. Are you familiar with any state, other than New York, that has adopted the procedure for limiting the extent of overlashing calculations, as you describe on Page 44 and 45 of your testimony?

A. I'm not.

Q. Under the NESC, is it appropriate for an electric utility to allow the loading of its poles to exceed the prescribed values, even if that excess over the prescribed values is small? In other words, is there sort of a tolerance for small violations of the loading standards?

MR. SEIVER: Objection as to form.

THE WITNESS: No, there's not.

BY MR. BUTLER:

Q. If that's the case, Mr. Harrelson, how would FPL or any other utility be comfortable that it was, in fact, in compliance with the NESC's loading requirements, if it were to allow certain overlashes to occur without a calculation of what the impact on the loading would be as a result of those overlashings?

MR. SEIVER: Objection as to form.

THE WITNESS: I think the key to that is what's meant by calculations. A determination does need to be made. A determination can be made in the same manner that FPL has developed distribution

guidelines for its field personnel.

They don't require calculations in detail in all cases. So a reasonable approach that is reasonably reliable, I think, is consistent with the word practicable, where the rule says that the standards will be reasonably practicable.

And what we're proposing, we'll -- if there happens to be any violation of the code -- and there are. There are rotten poles out there that don't meet the pole strength, and we know they reach almost 5 percent. So those are violations of the code, but that's an example where it's practicable to inspect those poles on an eight-year cycle, identify the ones that are violating the code and correcting them.

So if you compare the real world reality of field engineering, construction, maintenance, then the code does get exceeded. The code has a lot of safety factors, but the code does not anywhere in there say it's okay to exceed the requirements of this code. These are the requirements that are

deemed appropriate for safety.

MR. BUTLER: I think we're at our point where I'm going to put you on hold for a minute and then confer here and see whether we -- what else we have to ask. So I ask your indulgence for a couple of minutes.

MR. SEIVER: All right. Thank you.

(Discussion held off the record.)

Hearing Exhibit - 000951

MR. BUTLER: Okay. This is John Butler. I'm back. Just got a couple of follow-up questions, and then I will be done.

MR. SEIVER: All right. Witness is ready.

MR. BUTLER: Thank you.

BY MR. BUTLER:

Q. Going back to the question of calculating costs and benefits to the FCTA members of FPL's implementation of its storm hardening plan, we discussed the three years of it, 2007, 2008, 2009. But I think, Mr. Harrelson, a lot of your comments were directed at the lack of detail yet on some of the specifics for 2008, 2009.

I would like for you to focus on and just tell me, to the best of your ability, what additional information do you feel is needed in order to do a reasonable estimate of costs and benefits for the 2007

projects, given the information that's been provided to date by FPL.

A. I believe that the information to the extent that those projects have been completed can the gathered from the documents that have been provided by FPL and field surveys by engineering personnel on behalf of the cable operators. In other words, they can take the prints and see which poles were anticipated to be replaced or which poles were anticipated to be added.

They can then compare that to the actual construction in the field and see what hardware items, equipment, access problems, if any, they might have, and

they can put a accurate cost on 2007 to the extent those projects have been built in the field.

The engineering diagrams generally lack detail of the exact placement of the poles in the field. I think that process can be improved over time with what FPL has offered to share preconstruction conferences, and then a learning curve, so to speak, as these projects get completed and the cable operators get more familiar with the practices and with the problems that they encounter when they actually start to make these transfers.

Q. Have you or anyone else on FCTA's behalf gone out to the field, taking the engineering drawings FPL

has provided, and tried to make that sort of assessment of what facilities would need to be moved and, you know, what the cost to FCTA members would be of doing so?

A. I have made some observations and photographs, but without the level of detail that we're discussing now. I'm not really personally that familiar with all the hardware and the labor techniques that the crews use to transfer and to, if necessary, transfer underground transitions or splice out cables.

It's beyond my experience level to price that or to -- I would just have to make a separate trip altogether to be involved, and I don't know that I need to be involved. So if they have done some of that, I've not been informed of it.

Q. Okay. And last question, or perhaps series of questions for you, regarding the shielding effect of

trees and buildings we were talking about earlier --

A. Yes, sir.

Q. -- would you agree -- and I think this is probably particularly true with respect to buildings -- that, in some instances, buildings can actually increase the loading when you have venturi or other turbulence effects?

A. I have noticed in limited circumstances, walking between tall buildings, that you get an increase

in the wind between the gaps in the tall buildings. I don't know how that applies to urban areas or metropolitan areas, for that matter, so I don't know in detail how that might work.

I do know that you're sheltered if you stand behind the building, and you're subject to a lot more force when you step out from behind it.

Q. Right. But in these sort of venturi slot areas, you don't know whether there are poles in those locations in FPL's system or how much additional wind force would need to be accounted for for those effects; is that correct?

A. That's correct.

MR. BUTLER: Hold on just one second. I'm sorry.

BY MR. BUTLER:

Q. Mr. Harrelson, you may not be aware of this one way or the other, but just to go ahead and ask you: Do you know whether FCTA intends to provide any estimate of the costs and benefits of the FPL storm hardening

plan to the Commission prior to the hearing in this docket or at the hearing?

A. I don't know.

Q. Okay.

MR. BUTLER: Okay. Thank you, Mr. Harrelson.

That's all my questions. I appreciate your time.

MR. SEIVER: Thank you, John.

MR. BUTLER: Thank you for your indulgence.

MR. WILLIS: This is Lee Willis. Shall I go on, or do you want to take a break, Mr. Harrelson?

THE WITNESS: Well, we've been --

MR. TEITZMAN: Hold on one second. This is Adam with staff. I have Catherine with me to discuss what we're going to do regarding the Haines deposition.

MR. WILLIS: Okay. That's good.

MR. BUTLER: Why don't we go off the record.

(Discussion held off the record.)

CROSS EXAMINATION

BY MR. WILLIS:

Q. This is Lee Willis. I represent Tampa Electric Company. I would like to ask about, in Docket Number 070297EI, with respect to the storm hardening plan filed by Tampa Electric.

Mr. Harrelson, what techniques do you use to perform a loading analysis?

A. Are you referring to wind loading analysis or a complete loading analysis or all of the above?

Q. Let's start with wind, and then a complete.

25 A. I'm familiar with a hand-calculation method

that I don't use very often. I use generally standards and guidelines, such as in Florida Power and Light has developed for use in applying the wind loading guidelines, rather than the detailed calculations.

I have been involved in some detailed calculations and have used a computer for those calculations. It was based upon a lengthy, several-page process of calculations that was in the Alabama Power engineering manual.

Q. But, by and large, you would use rules of thumb; is that right?

A. Not rules of thumb, but you might call them that. I would call them engineering guidelines that are conservatively developed, such as FPL has developed for their use.

Q. What experience do you have using pole analysis tools and programs?

A. I have participated in applying that lengthy formula that I referred to in Alabama Power's engineering guidelines to a computer application.

I have had a brief conversation and sort of a guided tour of pole foreman with Mr. Malcolm Young, but I have not applied them in -- I've not applied pole foreman in the field. I have applied the other one I alluded to.

1 Q. Mr. Harrelson, if, as a result of a storm

hardening plan, outages are reduced and restoration times are improved following a major storm event, would you agree that all parties, including CATV companies, would benefit?

A. I agree that they would benefit. I also think that it should be based upon those benefits being cost effective, prudent and practical.

Q. If the CATV companies will benefit from the storm hardening plan, don't you believe that all -- that they should share an apportion of the costs of that plan?

MR. SEIVER: Objection as to form.

THE WITNESS: And my answer would be if those proportions and that share is fair and practical, cost effective, I agree.

BY MR. WILLIS:

Q. What is your understanding of how Tampa Electric will assign cost responsibility when they discover the pole is overloaded and the attachments have been permitted?

A. It's my understanding that, if Tampa Electric determines that the pole has been permitted, then they would not assign cost to the attacher that is permitted, but that determination is in Tampa Electric's

discretion.

Q. What is your understanding of how Tampa Electric will assign cost responsibility if it discovers a pole is overloaded and the attachment has not been permitted?

A. If in Tampa Electric's opinion it's not permitted, and if in their opinion the pole is overloaded, and they attend to the next step to determine if the attachment being, in their opinion, nonpermitted, caused the overloading, then they would do a complete safety inspection of the pole and assess any correction actions and pole strengthening make-ready required to that non or allegedly nonpermitted attachment.

Q. Mr. Harrelson, on Page 18, line 6 of your testimony you state that, "Tampa Electric's plan does not include specific technical design specifications, construction standards, construction methodologies that will be employed in the hardening of poles."

Now, what additional information do you need to evaluate Tampa Electric's plan that has not been provided?

A. It would be helpful, and I'm not saying that it has not been -- it's not possible for Tampa to provide it, but they did not provide in their plan their

distribution standards book. They simply described the standards, rather than including the standards in the book, as some of the others did.

Certain of those distribution standards are necessary for the engineering and reengineering of cable attachments. And if it's requested, then I would hope that Tampa Electric would make it available, if and when it's requested, to have access to those details of standards.

Hearing Exhibit - 000958

Q. But you haven't requested that; have you?
A. I have not.
Q. Okay. Would you agree that Tampa Electric has acted in good faith in trying to exchange information with you and the CATV and FCTA in this proceeding?
A. I would agree that there's been a sincere effort to provide the information that is available. I believe there's not sufficient information available until the projects have been engineered and field considerations have been taken into account. And I understand that it's not necessarily practical to do that before the general plan's even improved. But still, it has not happened.
Q. Did you mean to say, before the plan is improved?
A. That's what I meant to say. I'm sorry.

Q. Okay. Well, won't the -- will the process within the process to which we've all agreed remedy this concern?
A. I believe that process within a process does have great potential to eventually relieve all those type concerns. If everyone works on it and participates and improves it with the experience, I do believe it does have that potential, yes, sir.
Q. Okay. On Page 18, line 17, you say that, "Tampa Electric did not indicate the joint use poles affected by the projects."
You do agree that Tampa Electric did hold meetings with the attachers to discuss Tampa Electric's

projects; do you not?
A. I do, yes.
Q. And maps of the affected routes were provided?
A. The routes, yes, but not individual poles.
Q. Tampa Electric made an offer to ride each affected circuit with each of the attachers; did it not?
A. That's correct.
Q. And did you take advantage of that offer?
A. We did, to the extent that it was practical for us. We met with Tampa Electric's engineer. I don't recall his name at this very moment, a very nice fellow. He provided as many plans of the pilot projects as were

available, pointed out some other projects that we were interested in. We had a productive discussion. He spent the entire morning with me and a representative from Brighthouse. He had a meeting to follow up on storm preparedness plans, and we said we were very comfortable in taking those maps and doing our own ride without him having to ride with us.

However, those were line maps of the route. They were not detailed plans of which poles would be changed, which poles might have intermediate poles set. So the details are just not available yet. And to answer the question, you have to answer it no, the detail is not there, because it's just not there.

Q. But we do, as you mentioned, have a process to remedy that situation; correct?
A. Yes, sir, that's correct.
Q. And you also contend that the plan does not

contain enough details about costs. Tampa Electric has provided additional cost information in discovery; isn't that correct?

A. I'm sure they have. I don't recall the details at this moment.

Q. Okay. Have you now been able to conclude that you have sufficient information to enable third parties to determine their costs?

A. Not until the process within a process has a chance to work. In other words, until Tampa Electric decides which poles will be actually replaced and whether or not those poles will be placed in a physically different location, the details of pricing out the work on after the cable attachers is not possible.

Q. You indicated in your testimony that you were analyzing the materials that Tampa Electric provided. You did this on Page 19, line 15. Have you completed that analysis?

A. I believe what I said is it was being evaluated, and I believe that Brighthouse is doing that. And I don't know the answer to the question.

Q. Okay. On Page 29, line 1, you mentioned the 2001 audit. Are you familiar with Tampa Electric's pole attachment audit conducted in 2001?

A. I've heard it mentioned, and just a few details about it is the extent of my knowledge.

Q. Do you agree that that audit showed that CATV operators had a 20 percent unauthorized attachment rate?

A. I don't know the details, and I would, though, say that an alleged unauthorized attachment rate -- so I'm not sure about the details of what's considered -- what the definition is used for unauthorized attachment.

Q. You will agree that the attachers did pay back rent for the unauthorized attachments that were discovered in that audit; correct?

A. I have no reason to believe they did not pay attached rent for whatever counted attachment rate. But, for instance, if you allow drops to be attached without permit, then -- and then later categorize those as unauthorized attachments, that would be an example where I would say was not really an unauthorized attachment; it's just unnoticed attachment.

Q. You refer in your testimony at Page 28, line 17, about a, "standard practice of conducting a preconstruction engineering ride." Do you recall that?

A. I'm sorry. Would you give me the page number again.

Q. It's Page 28, line 17.

A. Yes, I see that.

Q. This standard practice didn't prevent a significant unauthorized attachment rate on Tampa Electric's system; did it?

MR. SEIVER: Objection as to form.

BY MR. WILLIS:

Q. Well, let's say it produced a 20 percent unauthorized rate in Tampa Electric's system.

MR. SEIVER: Same objection.

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THE WITNESS: Yeah. I'm not sure I know the answer to that one, either.

BY MR. WILLIS:

Q. Do you know if CATV companies were required to pay any make-ready costs as a result of that audit?

A. I do not know those details.

Q. Do you know the scope of Tampa Electric's pole attachment audit in 2001?

A. I do not.

Q. And yet you concluded on Page 31, line 2, that it was just a billing audit; did you not?

A. That's what it states. It might be better to rephrase that, if it was primarily a billing audit or one of its main purposes was a billing audit. I will just confirm that's what's stated there, and that's what I wrote. But do you have a follow-up question about it?

Q. Let's go on to a different subject. On Page 33 at line 24 --

A. I'm there.

Q. -- you stated that, "In my experience, third-party attachments do not significantly increase the load on poles, and overlashing has only a very small effect on the already attached strand and cable assembly."

Mr. Harrelson, do you agree that CATV

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attachments and overlashing does place an additional

Hearing Exhibit - 000963

loading on a pole?

A. I do.

Q. Can a third-party attachment cause enough load on a pole to create an overloaded situation?

MR. SEIVER: Objection as to form.

Did you mean a third-party overlash attachment?

MR. WILLIS: I just said an attachment.

MR. SEIVER: Okay.

THE WITNESS: It's possible.

BY MR. WILLIS:

Q. Can an overlash create enough load to create on overloaded situation?

A. It's possible.

Q. What's the largest cable a CATV company has included in an overlash, in your experience?

A. The largest cable that it has added to an existing cable assembly?

Q. Yes.

A. I'm not sure, but I would think in some cases, if they're overlashing coaxial cable, it could be as large as 1 inch.

Q. Okay. How many cables can be placed in an overlash bundle?

A. It depends upon the design of the strand wire, the span length and the characteristics of the span, so that would vary, and I'm not certain that there's a specific limit. I don't know the specific answer to that question.

Q. Could it be as many as six?

A. I have seen six, yes.

Q. Have you seen more than six?

A. I'm not certain of the maximum number I've seen, but I would say it was in the vicinity of six or maybe slightly more.

Q. Okay. Mr. Harrelson, do CATV members engage in overlashing without providing advanced notice to the electric company?

A. That depends upon the arrangements or the practices with different companies. It varies from different companies; it's company to company.

Q. Well, let's talk about Tampa Electric Company.

A. It's my understanding that the practice has changed over time. There was a point in time, I believe, when Tampa Electric did not require advanced notice. But now they are saying that it will not only be advanced notice, it will also be preengineered with a very detailed preengineering process.

Q. You would agree that CATV operators do know in

advance that an overlashing is planned by their particular companies; do they not?

MR. SEIVER: Objection as to form.

THE WITNESS: I think it's reasonable and logical that they know some in advance, and there are emergency situations where there's very little advanced notice. But they have to know some in advance in order to gather up their materials.

BY MR. WILLIS:

Hearing Exhibit - 000965

Q. All right. In fact, don't they make plans and budgets for as much as a year ahead for these activities?

MR. SEIVER: Objection as to form.

THE WITNESS: I'm not specifically familiar with budgeting and planning for cable TV projects, but I'm sure that does happen in some cases.

BY MR. WILLIS:

Q. How far in advance does that occur; do you believe?

MR. SEIVER: Objection as to form.

THE WITNESS: I don't know.

BY MR. WILLIS:

Q. Now, you advised -- set out a pole inspection process -- I believe it starts on Page 34 -- I'm not sure where it starts. You set out in your testimony a

plan that calls for a loading analysis after the effect of the attachment or overlash by the attaching entity; do you not?

A. I think it's limited to overlashing, and perhaps it starts on Page 34, line 12.

Q. Yes. I had line 1, which threw me off. It is line 12.

A. What I proposed there is a reasonable engineering approach, practicable approach. It has very limited likelihood that the pole would not -- that the pole would actually become overloaded and, if so, for only a brief period of time. It requires some coordination, some communication and some evaluation on

the front end by the cable operator, but such a process could be worked out.

Q. But your plan provides no notice to the electric company in advance of the overlashing; is that right?

A. That's what I propose, yes.

Q. And there would be no notice if the CATV inspector finds no overload; correct?

A. I'm not sure there would be no notice, but I would have to review the specifics.

Q. Well, the specifics are yours; right?

A. Well, I don't recall the details. I think

you're correct, though, that if there's no overloading, then notice is not required.

Q. And there's no provision in your proposal for producing the calculation of the loading analysis or the location of the poles overlashed; correct?

A. That's correct. A calculation, a detailed calculation based on detailed measurements is not necessary, is not required by the National Electric Safety Code. A determination based on reasonable engineering criteria is required, but not specifically a calculation.

Q. Now, if a CATV inspector finds an overloaded condition due to an already completed overlash, the revelation of that fact will cause a great deal of trouble for a CATV company; will it not?

MR. SEIVER: Objection as to form.

THE WITNESS: I wouldn't characterize it as a

great deal of trouble. I think it's an accommodation, and they would serve their interest to consider it an opportunity to make this plan work successfully.

BY MR. WILLIS:

Q. Well, Mr. Harrelson, isn't there a powerful incentive to take the attitude that the overlash is just a diminimous addition and that no burden has been placed

on the pole?

A. No, that's not the intent. And I don't think, in the long run, it would benefit either party to take that approach. It is an attempt to have a practical realization of the minimal effect of that added load, and to promptly correct any problem that might occur as a result of the little bit of load that's added at a low level on the pole -- not near the top of the pole, but near the middle of the pole.

MR. BUTLER: Okay. Thank you, Mr. Harrelson.

THE WITNESS: Thank you.

MR. SEIVER: Thank you, Lee.

Who's next, staff or Gulf?

UNIDENTIFIED SPEAKER: Staff can go next. That's fine.

UNIDENTIFIED SPEAKER: Do you need some time, or shall we just keep going?

MR. TEITZMAN: I believe Staff can keep going.

CROSS EXAMINATION

BY MR. TEITZMAN:

Q. Mr. Harrelson, are you ready?

A. I'm ready, yes. Thank you.

Q. Okay. Once again, my name is Adam Teitzman. I'm an attorney with the Commission. I'm going to go through my questions in docket order. A lot of my

questions have been asked, so I apologize. I am going to skip around a bit, but I would like to start off with the Tampa Electric docket, which is 070297, and I would like to refer to Page 20, line 5, of your testimony.

A. I'm there.

Q. And here you see that transferring to a steel or concrete pole is significantly more expensive than a wood pole?

A. Yes.

Q. Could you please detail the increased costs?

A. No, I asked a few questions, and those costs apparently vary considerably. And I just don't have the answer to that question, except that I have been told that it's significantly more than transferring to a wood pole.

Q. I would like to move on to line 13 of that same Page 20. Here you discuss significant delays in the visiting service. Could you please explain why you believe service would be delayed?

A. As I understand the urgency of providing service to new customers is that if, for instance, a fiber optic line needs to be extended to that new customer, if it cannot be delivered within 30 days maximum, then that customer will choose an alternative means of getting that service.

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So it's very important to the competitive success of the cable industry or anyone else that's competing with them to be able to fulfill a new order in a reasonable period of time. And I've been told by some of the cable operators that 30 days is really pushing it to ask a customer to wait for a service that they've decided they're willing to pay for.

Q. I would like to move on to line 19 of that same page. Here you state that, "Building to extreme wind loading may actually increase storm-related outages and recovery time."

Could you please explain how placement of a stronger pole would lead to more outages?

A. I'm sorry; I was trying to reread what that says. "Actually increase storm-related outages and recovery times." The concern there is that in the limited locations described where tall trees tower above the lines and are very likely to be brought down by extreme winds, then those tall trees will destroy a great C line or a great B line or an extreme wind designed line.

The time that it takes to replace those concrete poles or steel poles is greater than the time to replace the common size of the poles that are used for Grade C construction and Grade B construction.

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Therefore, particularly for extreme wind loading, if tall trees come down and break poles, those poles are

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typically not available in large quantities on short notice, such as wood poles are.

Q. Just to clarify, so you're discussing the length of outages, not the frequency of outages; is that correct?

A. Yes, I think it's more to the storm-related duration of outages rather than the actual number of outages that would occur because of a storm event.

Q. Okay. Thank you.

I'd like to now go to Page 24, lines 19 through 22 of your testimony.

A. I'm there.

Q. Could you please explain what you are using as a reference to determine that an 8.5 percent pole failure rate is an unreasonable percentage?

A. Again, this is referring to a screening, visual screening that was done, and 1500 poles were identified for a follow-up, detailed, engineering analysis to determine if they were overloaded, according to the detailed analysis.

And 8.5 percent of a total population of poles is much higher than the defective rate that's found on the ground line inspection. It's a very high reject

rate, when you consider the large population of poles.

Q. Mr. Harrelson, I believe earlier on today you stated you had a copy of Tampa Electric with Mr. Haines' rebuttal testimony; is that correct?

A. I do.

Q. Okay. I'd like to refer to Page 20 of

Hearing Exhibit - 000971

Witness Haines' testimony.

A. All right. I'm there.

Q. Okay. Here Mr. Haines is discussing the Pole Foreman, O-Calc, and LV Field software, and he states that all these applications consider the items questioned by Mr. Allison (phonetic), including the guying effects of other lines, cables and guys on poles.

Have you reviewed these software products?

A. I have done a limited review and a brief discussion of Pole Foreman with Mr. Malcomb Young, so, to that extent, I have reviewed Pole Foreman.

Q. Have you been able to confirm whether Pole Foreman takes the guying effects of lines into account?

A. It's my belief that it does not. I am not at all certain that it could not, if -- if certain input -- additional input was made.

But as it's generally used, considering the way it was explained to me, I do not believe that it

fully takes into account the guying effects of lateral lines from poles.

Q. I would like to now refer to Page 26 of Mr. Haines's testimony. And here Witness Haines is referring to Pole Foreman screens, which are attached as Exhibits RBH-2.

A. Yes.

Q. Do you agree with Mr. Haines' assertion that these pages indicate that Pole Foreman does integrate data concerning guying effects of lines into account in

its calculations?

A. Well, that's a little bit longer answer than no. But to the extent that Pole Foreman calculates the necessary strength of a guy to counteract the tension placed on the pole bilateral lines, yes, that is what those screens are illustrating, that Pole Foreman is calculating the necessary strength, verifying that the guy is strong enough to withstand the tension applied to the pole by the lateral line.

The additional step that I advocate is not illustrated there. I think Pole Foreman could be utilized to do this additional step. The additional step would be to determine the remaining strength of the guy wire, considering the safety factor that's applicable, and whether or not that additional strength

of the guy wire would assist that pole, make that pole stronger to resist wind load. And, correspondingly, on the wire itself, the lateral line, a similar calculation I believe can be done, and should be done to determine the effect that those lines have in making that pole stronger.

Because it's commonly accepted that those poles are stronger; it's just a little tedious to do the mathematical calculation. And FPL has agreed with me that those are real considerations, but they have pointed out that it's a bit more difficult mathematical calculation.

Q. Thank you.

I would now like to move to Page 21 of

Witness Haines' testimony, starting with line 1. And here Mr. Haines is discussing the situation where an attacher will have cost responsibility when an attachment is made without receiving approval that's caused an overload situation.

Do you agree with the proposed resolution that Mr. Haines set forth here?

A. Not entirely, and the reason that I think there's legitimate concern, Tampa Electric intends to be the final judge of whether a attachment is authorized or has been permitted. In other words, if Tampa can't find

a copy of a paper document, they are saying the cable operator must produce that document.

Those documents in some cases are decades old, if they exist. There is precedent for verbal permission to have been given for poles to have been added by Tampa Electric and the attachment made without all the paperwork documentation. There's many, many reasons why attachments get made without paper documents being created and preserved for decades and handed from one owner to another owner, and that's the situation in Tampa.

If those guidelines are applied reasonably and fairly, then that would go a long way toward relieving a lot of that concern.

Q. Could you clarify what you mean by paperwork?

A. Well, an application for attachment is traditionally a paper document, in a perfect world. Some people have not required the paper documents; some

of the paper documents were submitted, but never executed and returned.

It just depends on -- it reminds me of when I get stopped by a traffic patrolman. If he gives me a warning, then I don't document it as well as if he actually puts a fine on me.

Sometimes the paperwork is just not painfully

executed and followed through with, and that's the case in almost every large cable system that has been in business for decades. And I think it's also the situation Tampa Electric finds itself in. They don't have complete paper records. So if they don't have them, they say, all right, it's up to the cable operator to prove it.

Q. Would you agree that a third-party attacher also has the responsibility to maintain that paperwork or make sure that they have received it back?

A. I would say they have a responsibility to the extent that those systems have been in place and have been utilized. If there's a history, for instance -- and I don't know that this is the case -- applied for a permit, that permit doesn't get followed up on, executed and returned, then it's not reasonable for that operator to go and demand better paperwork from the one that's requiring it in the first place. But those are just examples.

There's many reasons, such as when a cable company is a small -- what we call a mom and pop corporation gets bought by a larger corporation,

sometimes that paperwork just was not preserved.

Q. All right. I would like to move on to your testimony in Docket 070298, and that would be the

Progress Energy docket.

A. Okay.

Q. I would like to start off with Page 10, lines 6 through 7.

A. Okay.

Q. Here you state that, "Furthermore, the company's attachment standards and procedures should not be in the plan for purposes of Commission approval."

Is this statement applicable to all dockets in this proceeding?

A. It is, as far as the entire set of attachment standards and procedures relevant to cable TV attachments, yes.

Q. Do you have a copy of the Commission's storm hardening rule with you?

A. Yes.

Q. I'd like to refer to Section 5 of the rules.

MR. SEIVER: Can you hold on for just one second, Adam. We had it out right here, but it's under some stuff.

MR. TEITZMAN: Okay.

THE WITNESS: Section 5, I'm with you, yes.

BY MR. TEITZMAN:

Q. It's titled Attachment Standards and Procedures?

A. Yes.

Q. Do you believe the commission is required to approve the attachment standards which were attached to the file plans?

MR. SEIVER: Objection as to form.

But go ahead.

THE WITNESS: Well, I'm sure you're aware there's an issue of jurisdiction of what the FCC has jurisdiction over and what the Florida Public Service Commission has jurisdiction over.

But in reading this rule, we read the rule to state as part of its storm hardening plan, each utility shall maintain written safety reliability, pole loading capacity, and engineering standards and procedures, et cetera. It says it shall maintain them. It does not say they shall attach them to the plan and have them approved by the Commission, is our interpretation.

BY MR. TEITZMAN:

Q. If a third-party attacher has an issue with the company's attachment standards, do you believe there is a venue for providing input or for dispute resolution?

A. We believe that only the attachment standards which pertain to the strength of the line should be

subject to that jurisdiction of the -- in other words, the strength of the poles applicable to the Florida PFC

jurisdiction is my understanding, but I'm not an attorney.

Q. I'd like to refer to Page 15 of your testimony, lines 25 through 25.

A. I'm there.

Q. Why would stronger poles result in more failures during a storm?

A. I'm sorry; I'm on the wrong page, or can we recheck the page and line?

Q. It says at Page 15, lines 24 through 25 -- I might have the wrong --

A. Okay. It continues on to Page 16. It started out talking about vehicular accidents, and continues on Page 16 talking about increased storm restoration delays.

Q. So once again it's regarding -- it's not -- well, let me restate -- let me reask my question: Why would stronger poles result in more failures during a storm?

A. And, again, I don't think it was intended on my part to mean more failures, but that the failures would take longer to repair. Because they're special poles; they're sometimes not even readily available. In

some instances, if they are available, they take extremely heavy-duty equipment, such as cranes, to get to the work site during those emergency conditions.

In other instances, the concrete poles are replaced only temporarily with a weaker, but readily available, wood pole. That wood pole would necessarily

have to be changed out at a later date, at great expense, during conditions when the line is on. And, therefore, the work procedures are much more painstaking, in the interest of safety, to work that line energized at the primary voltage.

Q. Okay. I would like to stay on Page 16, lines 10 through 13.

Do stronger poles cause more cascading effects or fewer cascading effects?

A. I would say that stronger poles are not at all likely to cause more, but, on the other hand, they are not guaranteed to cause fewer. It depends upon the circumstances, but cascading is a common problem wherein sound poles actually fall.

Maybe an example would be helpful: FPL had a failure of the 500,000 volt lines that involved cascading. They had two different structures that had problems. Those two structures failed and caused a large number of extremely strong structures to fail.

But once the cascading started, the design, even though it was very strong, was not strong enough to hold the line up, once the line started falling like dominoes.

Q. All right. I would like to move on to the next docket, 070299, which is the Gulf Power Company docket. And I just have a couple of questions, starting on Page 13.

MR. WILLIS: Excuse me. What did you just refer to?

MR. TEITZMAN: Oh, Page 13 of Mr. Harrelson's

testimony in Docket 070299, Gulf Power docket --

MR. WILLIS: Okay. Thank you.

BY MR. TEITZMAN:

Q. -- and specifically lines 16 through 25.

If a pole of 60 feet or less were constructed to Class B, would it be more reliable against flying debris than a Class C pole?

A. Up to a certain limit it would be. If it's small debris that wouldn't break that narrow range of strength or that -- whatever the range is between a Grade C construction and Grade B, then, yes.

If it exceeds Grade B, then it's going to break Grade C or Grade B, if the size and mass and speed of the debris. So it's a difficult question to give a yes or no answer, but there are some circumstances where

a Grade B would survive better than Grade C.

Q. Okay. Did --

A. Of course, the design strength of a line is not predicated simply on the size of the poles. It can be a lot of other factors that strengthens the line design.

Q. I'd like to move on to Page 15, line 1. And here you identified that there are 217 members of the NESC Committee; is that correct?

A. That's not correct. What that's intended to convey is that 217 users or organizations which use the NESC bother to send comments, written comments in about the application of the rules.

So, no, they're not members; they are people

who utilize the code. Typically, it was a response on behalf of, say, an electric power company. There were 217 commenters.

Q. Are the members of the NESC Committee largely made up of industry personnel?

A. Well, one industry or another. But there are members on there from the electric power industry, from the telephone communications industry, from the cable TV communications industry, from the IBEW, from various governmental agencies. And the list is in the front of the code book.

Q. All right. I'd like to now move on to Docket 070301. This is a Florida Power and Light docket, just a couple of questions here.

I would like to start off with Page 12 of your testimony in that docket.

Mr. Harrelson, do you have that testimony out?

A. I do, yes.

Q. Okay. On line 8 you state that, "FPL's plan is not prudent, practical or cost effective"; is that correct?

A. That's correct.

Q. And now I'd like to refer you to Page 29, beginning on line 22. Here you state that the company's plan does not yet include enough information about the cost and benefits of its storm hardening plan to enable you to provide a specific estimate of the costs and benefits that the company's plan will have on third-party attachers.

How do you reconcile this statement with the comments on Page 12?

A. I don't think the statements are very closely related, in the first place. If the plan itself now submitted is -- and it's not, in my opinion, prudent, practical or cost effective, that does not mean that it will or will not be approved.

This statement on Page 29 assumes that the plan, as submitted, cannot be a price tag put on it. So if it's approved, I can't put a price on it; if it's not approved, I can't put a price on it.

And as a separate recommendation, my finding is that the plan, as a whole, is not prudent, practical or cost effective. It's excessive.

Q. But if you don't have enough information, how do you make that determination?

A. Well, I think it's very clear, and I've stated that Florida Power and Light did a tremendous amount of engineering work and developed by far the most comprehensive and detailed plan. So the extent of the plan I feel like I have a good understanding of.

The cost of the plan and the impact on third-party attachers is clearly ill-defined because of the large range of FPL's estimate of the total cost and their acknowledgment and everyone's involvement in developing the process within a process to try to get additional details as they become reasonably available to do the cost data.

So, to me, it's -- I don't really see the

relevance of tying these two things together, because they're not closely related in my mind. But I might be missing something.

Q. I'd now like to refer you to Page 15 of your testimony. And beginning on line 15 you ask whether or not other Florida IOUs have filed storm hardening plans that embrace the EWL standard, as FPL has done.

And you respond, "No other utility is planning to take this approach"; is that correct?

A. Yes, that's correct.

Q. Do you have a copy of Witness Miranda's testimony?

A. Yes, I do.

Q. Do you have a copy of Exhibit MBM-1?

A. I'm sorry; I do not have a copy of the exhibit.

MR. TEITZMAN: All right. Well, with that, Staff has no further questions.

Thank you.

THE WITNESS: Thank you.

MR. CAMPBELL: This is Russ Campbell on behalf of Gulf Power Company. And in light of the series of questions just asked by the Mr. Willis and by the Staff, I would like to take about a five-minute break just to kind of cross some topics off of my list and get a little organized here. Would that be okay with everyone?

MR. SEIVER: That's fine with the witness and

FCTA.

MR. TEITZMAN: Staff has no objection.

MR. CAMPBELL: Okay. Let's go off the record. I'll rejoin in a few minutes. Thanks, guys.

(Discussion held off the record.)

CROSS EXAMINATION

BY MR. CAMPBELL:

Q. Good afternoon, Mr. Harrelson.

A. Good afternoon, Mr. Campbell.

Q. I'm going to ask you a series of questions that relate to the testimony that you filed in the docket that concerns Gulf Power Company. Do you have that testimony in front of you, sir?

A. Yes.

Q. First I would like to start with your CV that is attached to the testimony and clarify your background just a little bit.

In looking at the testimony that you have previously submitted as an expert, I identify seven matters in which you have been qualified as an expert to provide testimony on joint use issues that does not concern a personal injury case; is that accurate?

A. I don't have that in front of me, but I believe that's accurate.

Q. Okay. And of those seven matters, two of them

relate to the Gulf Power matter that was tried before the FCC, Items 3 and 4 on that list; is that accurate, sir?

Hearing Exhibit - 000984

A. It is, yes.
Q. Is it also accurate that in each of those seven instances you testified on behalf of the attaching entity, specifically cable television companies?
A. Yes.
Q. And in each of those cases you testified against the pole owner; correct?
A. Yes.
Q. Is it also accurate that in each of those instances you were retained by the law firm formerly known as Cole Raywid, now going by a different name; correct?
A. That's not entirely correct. One of the gentlemen had previously worked with Cole Raywid, and he has changed law firms, as well.
Q. And he went to the Hogan and Hartson law firm; correct?
A. That is correct.
Q. Okay. Am I accurate, sir, that you have never been qualified or testified as an expert on wind loading issues?
A. That's correct.

Q. Is it also accurate, sir, that you have never been qualified or testified as an expert on storm hardening issues?
A. There's correct.
Q. Is it also accurate that you've never been qualified or testified as an expert on the impact that telecommunications attachments would have on wind

loading?

A. I think that's correct, too.

Q. And it would be the same answer with respect to the impact that cable TV attachments would have on wind loading; correct?

A. Yes.

Q. Is it also accurate that you've never been qualified or testified as an expert on the impact that overlashing attachments would have on wind loading?

A. I think that's correct, too.

Q. Is it accurate, Mr. Harrelson, that you have never been qualified or testified as an expert concerning the cost or benefits of a storm hardening initiative?

A. That's correct.

Q. Is it accurate, Mr. Harrelson, that you have never been qualified or testified as an expert on any forensic analysis storm damage to a pole network?

A. That's correct.

Q. In looking at your testimony on Page 5 -- and, again, this is the testimony you filed concerning Gulf Power's plans -- at lines 14 through 21 you describe some experience you've had with respect to storm damage, and I think you described that earlier as anecdotal experience; is that accurate?

A. Lines 14?

Q. Yes, sir, lines 14 through 21 on Page 5.

A. No, I don't think that's entirely accurate. I worked on those recovery efforts for a number of days,

and I'm sure I probably described some of the gathering of forensic data as based on anecdotal information in my experiences from the field. But I'm not sure what you're quoting from.

Q. Yes, sir. Did you retain any data from your experience in viewing the impact of the storms you reference in that section of your testimony?

A. Not in the form of a forensic analysis. I have some photographs, I'm sure.

Q. Do you have any notes or any calculations you did with respect to the causes of the damage there?

A. No.

Q. There are no documents that we could ask you to produce that would support the allegations you make

on Page 5, lines 15 through 21, of your testimony?

A. I don't have any documents.

Q. Given that fact, Mr. Harrelson, is there any way for us to verify, in terms of hard evidence, the assertions you are making there in that section of your testimony?

MR. SEIVER: Objection as to form.

THE WITNESS: Not that I'm aware of.

BY MR. CAMPBELL:

Q. Now, you have spoken in response to some of the questioning you've had here today about scientific data concerning the benefits associated with storm hardening. My question is a pretty broad one, so take your time with it, but what would you need, Mr. Harrelson, as an expert, to feel comfortable that

you have sufficient scientific data to opine on the benefits associated with storm hardening?

A. Are you referring to forensic data?

Q. Any data, what would you need, Mr. Harrelson, to feel comfortable that you could analyze the benefits associated with storm hardening?

MR. SEIVER: I'm going to have to object, I guess, on vagueness grounds. Do you mean a particular storm hardening plan, or just storm hardening generally?

BY MR. CAMPBELL:

Q. Let's take Gulf Power's plan.

A. I have offered the testimony and the opinions that I have offered to all four plans, based on my experience, my familiarity with the codes, and the information that's available to me. But I'm not sure I follow your reference to scientific data.

Q. Yes, sir. Do you think that we have adequate data now to analyze the benefits that would be associated with Gulf Power's plan?

A. And are you still talking about scientific data to analyze the benefits of Gulf Power's plan?

Q. Any data you need, Mr. Harrelson.

A. No, I think I am in agreement with what Gulf Power has stated, that the -- there are some estimates that can be made. I generally agreed with the effectiveness of Gulf Power's plan, with the exceptions I pointed out. So I'm not sure how to answer the question.

Q. Would you agree, sir, that in order to have an accurate read on the benefits that would be derived from implementation of Gulf Power's plan, that the plan actually has to be implemented?

A. No, I don't think I would agree to that.

Q. Why do you disagree?

A. The plan can be and has been evaluated based on the information that's been provided. And I've done the evaluation that I've done, I've expressed the opinions that I've expressed, as has Gulf Power.

Q. You retired from Georgia Power in 1992; is that accurate?

A. Yes.

Q. Is it accurate that all of the testimony that you have provided as an expert on joint use issues came after your retirement?

A. Yes, I think that's true, yes.

Q. Okay. In fact, in the context that we're here in today, your experience started in around 2004; is that accurate?

A. If you're referring to the FCC matters and Public Service Commission, yes.

Q. Joint use matters?

A. Joint use has been involved or attachments have been involved in a number of the civil proceedings, as well.

Q. Right. Let's narrow it to outside of the personal injury context.

A. Right.

Q. That experience started in or around 2004; correct?

A. That's probably correct. I'm not looking at that exhibit.

Q. Am I accurate, sir, that even while you were at Georgia Power, your experience or your involvement with joint usage was pretty limited?

A. I would not agree with that. Pretty limited is pretty vague.

Q. Well, let's get more specific. Would you agree, sir, that as a percentage of your job duties and responsibilities, it was 10 percent or less?

A. That's a reasonable amount.

Q. That would be a fair estimate?

A. I would not argue with that estimate; that's correct.

Q. You didn't negotiate joint use contracts while you were at Georgia Power; correct?

A. I did not.

Q. You did not have overall responsibility for the joint use program at Georgia Power; correct?

A. For the entire company? No.

Q. It was someone else's job at Georgia Power to coordinate joint use practices and policies; correct?

A. That generally rested with two individuals of 10,000 employees; you're correct.

Q. And you were not one of those two individuals;

correct?

A. I was not.

Q. Mr. Harrelson, I think this is obvious, but I feel I need to ask it anyway, given some of the opinions you've offered: You're not a lawyer; are you?

A. No, I'm not.

Q. You're not here in this proceeding to offer any legal opinions; are you?

A. I'm not.

Q. Would you agree, sir, that the cross-section of the jurisdiction between the FCC and a state PFC is a legal issue?

A. I'm sorry, the cross-section of what?

Q. Let me phrase it differently. It's probably a poor question.

Would you agree that any dispute that exists between the jurisdiction of the FCC and a state public service commission is a legal question?

MR. SEIVER: I'm going to have to object to form, but answer if you can.

THE WITNESS: I would agree to it.

BY MR. CAMPBELL:

Q. There's been some testimony here today about the NESC. Am I accurate, sir, that the NESC is not a set of construction specifications?

A. That's correct.

Q. So it does not address each and every condition joint use entities have to confront or deal

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with in the field; correct?

A. Oh, it does address the requirements that must be accomplished that are necessary for safety.

Q. Yes, sir. It doesn't address all of them, though; does it?

A. Yes.

Q. It does?

A. It's not a construction standard; it is a performance standard, and it addresses all conditions --

Q. For example --

A. -- as a performance standard.

Q. Okay. For example, is the placement or spacing of guy anchors covered in the NESC?

A. Not specifically, and it doesn't even prescribe that you have to have guy anchors. So it's a performance standard with respect to any field conditions --

Q. And --

A. -- but not any construction technique.

Q. Is it accurate, sir, that many pole owners develop their own construction standards and specifications?

A. Yes, that's necessary.

Q. Is it accurate that many of those adopt, in whole or in part, provisions of the NESC?

A. That's true. I would like to explain that just a little bit.

Q. Sir --

A. Standards must comply with the requirements of

the NESC. To that extent, yes, they do.

Q. And it's also a fact, sir, isn't it, that many companies have certain specifications that exceed the standards set forth in the NESC?

A. That's correct.

Q. Isn't it fairly common that companies have some standards in the range of three to five, for example, in their construction specifications that might exceed NESC standards?

MR. SEIVER: Objection as to form.

Go ahead and answer.

THE WITNESS: I'm sorry, in the range of three to five -- and I didn't follow you.

BY MR. CAMPBELL:

Q. Yes, sir. Would it be fairly common for a company in this industry to have at least three to five standards that exceed NESC standards?

MR. SEIVER: Objection as to form.

THE WITNESS: And, again, three to five standards with respect to what?

BY MR. CAMPBELL:

Q. Construction specifications and standards for joint use issues.

MR. SEIVER: Same objection.

THE WITNESS: There are typically many, many construction standards that would exceed the calculated required standards within the NESC. For instance, you standardize perhaps on 35-foot poles and 40-foot poles. Those would almost always, in

every case, exceed the clearance requirements for lines that are specified within the code.

So to say three to five, I would say hundreds, because the code specifies the vertical clearances, horizontal clearances, tensions, strength. The code specifies hundreds of things that have to be satisfied.

And then using common, readily-available materials, then the combination of those materials almost always exceeds that threshold requirement with respect to strength, height, clearance and those variables.

BY MR. CAMPBELL:

Q. In addition to working with cable companies

concerning joint use issues, you have in the past worked with pole owners on some joint use issues, as well; correct?

A. Yes.

Q. Those would be cooperatives and municipally-owned electric providers; correct?

A. Predominantly cooperatives.

Q. Have you had any involvement with the overlashing policies and procedures employed by those cooperatives?

A. Not specifically, but just in general, yes.

Q. Do any of those cooperatives employ advanced notice requirements in their overlashing policies and procedures?

MR. SEIVER: Objection as to form.

THE WITNESS: I'm not familiar with any recent contract requirements of those companies. I don't recall.

BY MR. CAMPBELL:

Q. Whether contractual or otherwise, Mr. Harrelson, just to make sure my question is clear.

A. Could you repeat the question?

Q. Yes, sir. Your answer seemed to be limited to contractual requirements. And I'm asking you, without regard to whether it is contractually required or policy

required or orally required, do any of the cooperatives that you have worked with in the past require in some form or fashion advanced notice before overlashing takes place?

A. I have not been involved in that aspect of their business, but I do not believe that they require advanced notice of overlashing, in general.

Q. Have you made any determination or performed any work to determine the percentage of pole owners nationally that require advanced notice of overlashing?

A. I don't recall having done any of that. I don't believe I have.

Q. Have you made any analysis of the percentage of pole owners nationally who require some type of loading analysis before either original attachments or overlashing takes place?

A. I have not.

Q. As an expert in this area, sir, do you believe that there are any benefits to be derived from an

advanced notice protocol with respect to overlashing?

A. I think there are some limited benefits and there are some reasonable provisions that could be made for advanced notice, some exceptions to that. I think it's something that certainly should be negotiated, discussed and worked out in a reasonable manner, yes.

Q. What are the benefits that you could identify?

A. Well, there's a learning curve, as you've expressed or implied in your line of questioning. Most of the loading determinations for many decades had been made based on engineering guidelines, tables, pole classes, things of that nature, experience, a ride-out between the power company and the cable operators that intended to attach or overlash. And based on those engineering guidelines, which is based on detailed manual calculations or, in the last couple of decades, based more and more on computer-based calculations -- but there's a trend to do more computer-based calculations.

So there is a learning curve, and I think there's benefit to be gained from working together and learning when, where, and if advanced notice is required and what amount of overlashing can be done on an expedited basis with the goal of both the attacher and the pole owner of not bringing the poles down during storms or other events where the poles are overloaded by any of the facilities, either added by the power company or the cable companies.

Q. And what are the reasonable provisions that

you believe that could be made for exceptions to advanced notice of overlashing?

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A. Well, I think so long as a piece of software that has been used to evaluate the loading effects on a pole is well understood and it's thorough in its application of what the forces are, what the load is, then there's a learning curve there that can quickly narrow down the amount of detailed engineering analysis that needs to be made on pole after pole after pole that are so similar.

And you spend a tremendous amount of time and expertise on doing repetitive calculations on very similar poles, so I think it can be -- and should be improved on in Florida, because three of the four power companies are just introducing these detailed calculations, not only for the cable attachments, but for their own attachments, as well.

Q. From a workload standpoint, is it easier to cure an overload situation on the pole on the front end of that happening before it gets overloaded, or after the attachment is made?

MR. SEIVER: Objection as to form. Anybody's attachment?

BY MR. CAMPBELL:

Q. All right. Let's go back to an earlier line of questioning that I think Mr. Willis asked you. You would agree that it is possible, sir, for an overlashed

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communications attachment to create an overloaded situation?

A. It is possible to change the load on the pole, and it's possible to make it overloaded by any attachment.

Q. Let's stay in that scenario where a communication's attachment has been overlashed, and it has thrown the pole into an overlashed -- or overloaded situation. Is it easier to fix that problem on the front end before the attachment is made, or easier to do it after the fact?

A. I don't think there's a specific answer to that. There is certainly reasonable cause in many instances to go ahead and resolve a problem, get the serious problem addressed, and then correct -- for instance, we use the example of a concrete pole getting broken by a tree in a storm.

Common sense dictates to put a available pole back in and get the line up out of the street. That clears up the more serious hazard.

The pole is technically overloaded. There are a lot of safety factors in the loading calculations already, so the very minimal overloads that might be caused by an overlashing or an additional streetlight put onto the pole is not a serious safety concern, even

though it's technically maybe a percentage or two overloaded by the standard that has been adopted, especially if that standard exceeds the national code requirements.

Q. Is there any economic waste involved in a protocol that addresses overload issues after the fact, as opposed to in advance of the attachment being made?

MR. SEIVER: Objection to the form.

THE WITNESS: I think that would vary under the circumstances. I think there's definitely some circumstances where it makes sense to do what needs to be done for a more high-priority safety issue or business issue, and then to make any minor adjustment of guy wires or pole size or reinforcement.

And, again, the example of the practical application of inspection of poles at the ground line, it's well known that a percentage of the poles in any population fail the strength requirements. They're rotten, but it's not practical to inspect every pole every year.

Florida has just come up to the national standard of inspecting poles for... now, Gulf has been doing it for a while; I would like to acknowledge that. But it's practical to review

things after the fact in certain cases.

BY MR. CAMPBELL:

Q. Could you turn to Page 11 of your testimony, sir.

A. I'm there.

Q. On lines 12 through 14 you state that, "Lastly, the company," which in this instance is Gulf Power Company, "has not fully satisfied its obligation

to seek and attempt in good faith to accommodate input from third-party attachers."

What has Gulf Power done wrong in this regard, Mr. Harrelson?

A. We have had some discussions that have not fully been terminated, I hope, and I believe there has been communication. We've experienced some considerable change in Gulf's overall plan that we're now better understanding as a result of some of the rebuttal testimony. And it's just an ongoing process, and it's not complete.

Q. What about that incomplete process demonstrates bad faith on the part of Gulf Power Company, Mr. Harrelson?

A. I intended only to be quoting the language as required in the rule. I did not intend, and I apologize if I have accused Gulf of doing anything in bad faith.

Q. Thank you, Mr. Harrelson.

Further down that same page, on lines 23 through 25, you state that, "It is my understanding that other provisions of the NESC, including those related to clearances between power facilities and communications facilities, are not at issue in this proceeding."

My question is this, Mr. Harrelson: Could the presence of clearance problems on a pole be indicative of a possible overload situation?

MR. SEIVER: Objection as to form.

THE WITNESS: No, I don't see a direct connection.

BY MR. CAMPBELL:

Q. Could there be an indirect connection?

MR. SEIVER: Objection as to form.

THE WITNESS: Not that I'm aware of.

I would like to say that many of the separation issues on the pole are either caused by any one of a number of different individual parties, including the pole owner, and it's very difficult to determine who did each one of the steps at what period in time.

But the mere fact that there's 38 inches of separation between a communications facility and a power facility does not have any direct connection

to whether or not that pole is physically overloaded.

BY MR. CAMPBELL:

Q. While we're on that subject, that difficulty you just alluded to with respect to assigning fault for an out-of-compliant situation, that exists whether or not you're making a loading analysis determination prior to an overlashed attachment or after an overlashed attachment; correct?

A. That's correct. And the point of bringing that up is that it's controversial -- the resolving of those issues are controversial. They -- what information I have about it, it's within the jurisdiction of the FCC. And it's just going to confuse the issue in Florida if those are brought into the mix of finding fault and assessing costs.

Q. Could you turn to Page 18, please, sir.
A. I'm there.
Q. On line 7 -- this is a portion of a sentence that I'm going to read -- "I do not believe that Gulf intends to follow a reasonably-practicable transition to Grade B with respect to third-party attachers, but rather only with respect to Gulf."
What do you mean by that statement, sir?
A. It was at that time I wrote this the best I

could determine Gulf's intention to, not only evaluate third-party attachments to Grade B, but to require Grade B as a standard when third-party attachments are added to, as in overlashing or a new attachment.
I've since learned in their answers to -- or rebuttal testimony, perhaps, that they've clarified that now. I believe I understand that Gulf is going to use Grade C in evaluating the 500 poles for overloading, and that's a big relief.
So to the extent that I've had the wrong impression or bad information, whatever the case was, then if Gulf had been going to evaluate 500 poles for overloading by third-party attachments to Grade B, but through their wood pole inspection for Grade C -- and that's a great disparity -- the only remaining disparity is they're going to require Grade B strength when overlashing is done or new attachments are made.
And I'm -- it's my opinion that if Gulf applies that same standard to themselves when they add a streetlight or when they add or change out a service

attachment or do some sort of minor change to a pole, that they evaluate that pole against Grade B, and if it does not meet it, they're going to upgrade the pole, then at least it will be the same standard for both Gulf and its attachers.

Q. Do you have any evidence that would indicate, Mr. Harrelson, that Gulf Power does not intend to apply the same standard with respect to its own attachments?

A. I don't know. I would like to pursue that discussion, and I intend to. But at this time I don't know that they will.

It is a lot of work, a lot of effort to do a wind loading analysis detail on a pole when you're going to add a streetlight or when you're going to change out a service to a customer.

Q. But at this time, as we sit here today, you don't have any evidence that would indicate that Gulf Power intends to apply a different standard to itself?

A. I don't.

Q. The very next sentence says, "I am also concerned that Gulf may use its planned joint use audit to unfairly transfer some of the cost of building to Grade B to third-party attachers."

What are you talking about there, Mr. Harrelson?

A. That has a lot to do with the understanding, or misunderstanding as the case may have been, about their 500-pole strength assessment. That it was my understanding, based on a verbal answer at one time,

that they would be doing that to Grade B. But as I read

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rebuttal testimony now, they're going to use Grade C.

Q. Is it fair to say, sir, that that sentence that I just asked you about is no longer accurate?

A. I think it might have been at least largely based on information that I think now is changed and different. So to the extent that that makes it inaccurate, yes.

Q. Could you turn over to Page 21 of your testimony, please, sir.

A. I'm there.

Q. Lines 4 through 7, you referred to some additional cost information that you are analyzing.

Have you done any further analysis that requires any supplementation of the testimony you provided in this section?

A. Let me read that a little more in context. Hold on just a second.

Q. Yes, sir. Take your time.

A. Okay. I believe that this is similar to the concerns expressed about all of the future plans. Those plans have not yet been engineered, but the process within a process will help address that.

And I don't believe Gulf has any better information than they have, and I do believe that the full ability to calculate the cost impact on the cable

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operators is going to be dependent on the process and the process being successful.

Q. At the bottom of this same page, Page 21 of your testimony, Mr. Harrelson, you state that, "Annual pole rental rates will increase, possibly significantly."

Do you see that testimony?

A. Yes.

Q. I believe others have asked you about this, but I want to be clear. You have not undertaken any study or analysis of what that potential increase could be; is that accurate?

A. No. I have asked if anyone within the FCTA organization had those figures or had that information, but I have not done any analysis beyond just ask if that information had been provided or estimated.

Q. Yes, sir. And asked a different way, you do not have any data to support the statement you make at lines 24 through 25 on Page 21 of your testimony; is that accurate?

A. I've heard some numbers, but I don't recall exactly what those numbers are, for estimates of pole rental increases, the impact of it. I just don't have that information with me.

Q. Is it also accurate, sir, that you're unable

to quantify for us here today what you would consider to be a significant increase?

A. I could give a range. If there's a 10 percent increase in a three-year period, I would consider it

significant. But I don't have an answer beyond that.

Q. Could you turn over to Page 22, please, Mr. Harrelson.

A. I'm there.

Q. On line 4 there is a sentence that reads, "In addition, third-party attachers likely will experience significant delays in provisioning service to customers as a result of the new processes and standards the company is adopting in connection with storm hardening."

Do you see that sentence?

A. I do.

Q. Do you have any empirical data to support this assertion?

A. Help me with the definition. What does empirical mean?

Q. Just any kind of data to support that position.

A. I have been present during some discussions between Cox and Gulf about the lead times required by Gulf, and I have heard Cox state to Gulf that 30 days is a long time to ask their customers to wait, and that

could Gulf possibly allow the cable operators to do the load analysis or could we hire contractors approved by Gulf that would speed up the process.

And Gulf's response was that initially, at least, going in -- and I think Mr. McDaniel addressed this in his rebuttal comments -- initially Gulf insists on doing all the calculations, doing it with their contractor, providing enough lead time to be sure they

can meet the deadlines, but they'll make an effort to do that more promptly.

But I have clearly heard Cox, for one, to say that anything in excess of 30 days is going to be very detrimental to their ability to do their business.

Q. Other than this conversation which you've just described, any other data that you have that supports that allegation, Mr. Harrelson?

MR. SEIVER: Object as to form.

THE WITNESS: No, I think that's the most relevant. I don't recall any others.

BY MR. CAMPBELL:

Q. What would be a reasonable time frame within which to handle the issues that need to be handled on the front end with respect to overlashed attachments?

A. Well, as we've already discussed, I advocate notification after the fact on overlashing, under

certain guidelines.

Q. Yes, sir. And if your assertion is rejected and advanced notice would be deemed proper, what would be a reasonable timeframe within which to require advanced notice, if 30 days is too long?

MR. SEIVER: Objection as to form.

THE WITNESS: I believe I said, or intended to say, 30 days is the maximum that we would hope not to exceed.

BY MR. CAMPBELL:

Q. The last line of that same paragraph says, "Given the competitiveness in the communications service

markets, any delays likely will result in lost customers."

What is the basis for your assertion there, Mr. Harrelson? Is it this same conversation between representatives of Cox and Gulf?

A. That's part of it, and I've heard the same comments from other operators, too, that speed to market is a major concern, major goal.

Q. Have you done any study of that issue beyond your conversations with representatives from cable television companies?

A. No, I haven't.

Q. Are you aware of any past problems that cable

operators or other attaching entities have had with respect to Gulf and its overlashing policies and procedures?

A. Not past problems, no.

Q. Any current problems, other than what we have addressed already in our questions and answers?

A. No. As far as I know, Gulf hasn't actually implemented the -- but I don't know, now. I know that in the past Gulf did not require advanced notice of overlashing, so past problems, I've answered that. I do not know for sure what their present practice is, so I don't know.

Q. Could you turn to Page 23 of your testimony, please, Mr. Harrelson.

A. I'm there.

Q. On lines 14 through 16 there is a sentence

that reads, "It is well known that third-party attachments do not create the greatest weight or load burden on the pole."

What is the source of your statement that, "It is well known"?

A. I think it's based on experience. I think at least a couple of the companies in this docket, in their rebuttal testimony, have agreed with that, that cable doesn't create the greatest load burden.

Q. Is there any literature or studies that you could refer us to that would support that statement that it's well known?

A. No, that's experience based. And as I said, in rebuttal testimony, at least, I recall a couple of different instances where the power company said, well, that's true, but...

Q. On Page 24, beginning at line 7, are you there?

A. Yes.

(A brief recess was taken.)

BY MR. CAMPBELL:

Q. Mr. Harrelson, could I direct your attention to the bottom of Page 28 of your testimony.

A. Yes, I'm there.

Q. And there's a sentence that begins on line 25 with, "Finally," and rolls over to Page 29. Could you read that sentence to yourself, sir, and then my question is simply: What does that mean?

A. Well, it must have a typo in it. The sentence

means going from Grade C construction to Grade B construction. The way I understood it to be at that time would be less -- I understood at that time that the Grade B standard would be applied to the 500 poles.

But I understand now from the rebuttal

testimony that that's not going to be the case.

Now, I do also, though, consider that, as it's been verbally described, the process of identifying all violations on the pole, as well as the overload conditions, is going to be a very distracting controversy about the strength of the pole. So that's the intent of that sentence, and I believe there's a typo in the last part of it.

So those standards that are NESC requirements that don't affect the strength of the pole -- that are NESC requirements, but those NESC requirements do not affect the strength of the pole.

And, additionally, the Gulf Power requirements that exceed the NESC requirements, together, those requirements, if they neither have anything to do with the strength of the pole, they are really going to create a distraction on those 500 poles that are 20 years old, and now at least three communications attachments on them. And it's just going to lead to mass confusion, in my -- or a big dispute, in my opinion.

Q. What study have you undertaken concerning Gulf Power's past pole counts, if any?

A. None that I recall.

25 Q. What study have you undertaken concerning Gulf

Power's past safety audits, if any?

A. I'm somewhat familiar with Gulf's joint use program because of other work that I've done relating to the cable and Gulf Power. I have looked at a lot of documents of Gulf's permit application processing, and I'm somewhat familiar. I've done a lot more looking at poles in Gulf Power's service territory than I happen to have done in any of the other four power companies --

Q. To the --

A. -- of previous work.

Q. Yes, sir. I didn't mean to cut you off.

(Discussion held off the record.)

MR. CAMPBELL: Yeah, I didn't mean to. I though he was done with his answer.

BY MR. CAMPBELL:

Q. To the extent that you do have that familiarity, and to the extent that it's relevant to the testimony you have provided in this docket, is that set forth in this testimony dated September 7, 2007?

A. I don't understand that question.

Q. Yes, sir. You testified that you have some knowledge about Gulf Power's procedures, based on your past experience; correct?

A. Yes. I think it lends understanding to what Gulf has provided in this, yes.

Q. Yes, sir. And to the extent that it's

relevant to your analysis of Gulf's storm hardening plan, have you included that in the testimony that I've been questioning you about here today?

A. I've relied to a certain extent on it. I don't know that I've expounded on it or referred to it specifically.

Q. Okay.

MR. CAMPBELL: I believe that's all I have.

(A brief recess was taken.)

MR. SEIVER: John Seiver. I'm counsel for the witness. I guess it's cross, but since he's my witness, I don't know if I should call it redirect or what. And I want to ask if that's okay with everybody.

MR. BUTLER: That's fine.

MR. SEIVER: All right. Is everybody ready?

CROSS EXAMINATION

BY MR. SEIVER:

Q. Mr. Harrelson, you were asked some questions by Mr. Teitzman of the PFC staff, in particular on Page 12 of your testimony in the Florida Power and Light docket. And, in particular, he had asked you about a conclusion that you put in your answer that FPL's plan is not prudent, practical or cost effective.

Could you further elaborate on how you came to that conclusion?

A. Yes. On Page 12 of my testimony I was referring to the requirement that the application of extreme wind standards be prudent, practical and cost

effective, and I was evaluating that from the perspective that I have as a utility engineer and electric power consultant.

But the application on that broad scale in all terrain features, as we've already discussed, I consider to be not prudent and practical and cost effective from a electric utility standpoint.

Q. Mr. Harrelson, Mr. Teitzman also asked you on Page 29, where you had concluded in this testimony that you could not provide an assessment of the costs and benefits of the company's plan on third-party attachers.

Did that have any impact on the conclusion you reached on Page 12 as to the plan not being prudent, practical or cost effective?

A. No, but I was really considering that as a completely separate issue in that you need considerable detail, more than what was provided in the broad range of prices of the cost of the plan, to actually compute with any level of detail, which I believe is required by the rule, on the cost impact on third-party attachers.

So there's enough detail for me to, I think, reach an opinion that the overall plan is going to be very expensive and has aspects of it that's not prudent, practical and cost effective. I can't accurately translate that to the cost or benefits of the third-party attachments.

MR. SEIVER: Thank you, Mr. Harrelson. That's all I have.

So I believe we can conclude the deposition of

Mr. Harrelson at this time?

MR. BUTLER: I think that's right. There's no further questions from FPL.

MR. SEIVER: Yes, please, read and sign.

(Discussion held off the record.)

MR. WILLIS: I would like a copy, please.

MR. BADDERS: This is Russ Badders, and we would like a copy.

MR. BURNETT: Brunett from Progress Energy, Please.

MR. TEITZMAN: Adam Teitzman with Commission staff.

MR. SEIVER: Yes, we will get a copy when the original comes out.

(Discussion held off the record.)

MR. SEIVER: Yes, the witness will read

through me.

(Discussion held off the record.)

(Whereupon, the Deposition was concluded at 3:25 p.m.)

- - -

C E R T I F I C A T E

THE STATE OF FLORIDA

COUNTY OF PALM BEACH

I, Pamela J. Sullivan, Registered Professional Court Reporter and Notary Public in and for the State of Florida at large, do hereby certify that I was authorized to and did report said deposition in stenotype; and that the foregoing pages are a true and correct transcription of my shorthand notes of said deposition.

I further certify that said deposition was taken at the time and place hereinabove set forth and that the taking of said deposition was commenced and completed as hereinabove set out.

I further certify that I am not attorney or counsel of any of the parties, nor am I a relative or employee of any attorney or counsel of party connected with the action, nor am I financially interested in the action.

The foregoing certification of this transcript does not apply to any reproduction of the same by any means unless under the direct control and/or direction of the certifying reporter.

Dated this 25th day of September, 2007.

Pamela J. Sullivan, RPR, FPR

Job #893056

September 25, 2007

MICKEY HARRELSON
c/o JOHN T. BUTLER, ESQUIRE
FLORIDA POWER & LIGHT
700 Universe Boulevard
E-2 Law/JB
Juno Beach, Florida 33408
IN RE: 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING
Job#893056

Dear Mr. Harrelson:

Please take notice that on Tuesday, the 18th of September, 2007, you gave your deposition in the above-referred matter. At that time, you did not waive signature. It is now necessary that you sign your deposition.

As previously agreed to, the transcript will be furnished to you through your counsel or counsel for Florida Cable Telecommunications Assoc. Please read the following instructions carefully:

At the end of the transcript you will find an errata sheet. As you read your deposition, any changes or corrections that you wish to make should be noted on the errata sheet, citing page and line number of said change. DO NOT write on the transcript itself. Once you have read the transcript and noted any changes, be sure to sign and date the errata sheet and return these pages to me.

If you do not read and sign the deposition within a reasonable time, the original, which has already been forwarded to the ordering attorney, may be filed with the Clerk of the Court. If you wish to waive your signature, sign your name in the blank at the bottom of this letter and return it to us.

Very truly yours,

Pamela J. Sullivan, RPR, FPR

CERTIFICATE OF OATH

STATE OF Georgia

COUNTY OF Cobb

I, the undersigned authority, certify that Michael Harrelson personally appeared before me at Comcast Cable 600 Galleria, Ste 1100 Atlanta, GA 30339 and was duly sworn by me to tell the truth.

WITNESS my hand and official seal in the City of Atlanta, County of Cobb, State of Georgia, this 18 day of September., 2007.

Stamp:

Rachel Jones
Notary Public
Cobb County, GEORGIA
My Commission Expires June 21, 2009

Rachel Jones
Notary Public
State of Georgia

Personally known _____ or produced identification X.

Type of Identification produced drivers license

ERRATA SHEET

IN RE: E-2 LAW/JE

CR: PAMELA J. SULLIVAN, RPR, FPR

DEPOSITION OF: MICKEY HARRELSON

TAKEN: September 18, 2007 JOB NO.: 893056

DO NOT WRITE ON TRANSCRIPT - ENTER CHANGES HERE

PAGE #	LINE #	CHANGE	Should be	REASON
38	22	Curve S.B.	Curb	I did not speak clearly;
40	1	Querto S.B.	Pruerto	I did not speak clearly
50	11	Low density S.B.	Load density	"
166	14	strain S.B.	extreme	"
72	21	effective S.B.	effect of	"
78	13	guide S.B.	Guyed	"
79	16	ON SB	OWNED	"
84	22	events SB	effects	"
93	12	documents SB	dockets	"
96	1	or SB	for	"

Continued on next page

Please forward the original signed errata sheet to this office so that copies may be distributed to all parties.

Under penalty of perjury, I declare that I have read my deposition and that it is true and correct subject to any changes in form or substance entered here.

DATE: 9-28-07

SIGNATURE OF DEPONENT: Michael J. Harrelson

ERRATA SHEET

IN RE: E-2 LAW/CB

CR: PAMELA J. SULLIVAN, RPR, FPR

DEPOSITION OF: MICKEY HARRELSON

TAKEN: September 18, 2007 JOB NO.: 893056

DO NOT WRITE ON TRANSCRIPT - ENTER CHANGES HERE

PAGE #	LINE #	CHANGE	REASON
107	21	improved SB Approved	Id did not speak plainly
107	24	improved SB Approved	"
119	18	the visiting SB provisioning	"
120	20	great C SB grade C	"
120	20	great B SB grade B	"
122	12	Allison SB Harrelson	"
123	15	bi lateral SB by lateral	"
129	2	PFC SB PSC	"
166	18	now SB have	"

Please forward the original signed errata sheet to this office so that copies may be distributed to all parties.

Under penalty of perjury, I declare that I have read my deposition and that it is true and correct subject to any changes in form or substance entered here.

DATE: 9-28-07

SIGNATURE OF DEPONENT: Michael T. Harrelson

EXHIBIT NO. _____

DOCKET NO: 070297-EI – TAMPA ELECTRIC COMPANY,
070298-EI- PROGRESS ENERGY FLORIDA, INC.,
070301-EI – FLORIDA POWER & LIGHT COMPANY

WITNESS: VARIOUS

DESCRIPTION: STAFF'S COMPOSITE EXHIBITS - 7

DOCUMENTS:

1) Verizon's Response to Staff's First Set of Interrogatories (Nos. 1-7)

2) Deposition Transcript of Sanford Walker (including errata sheet)

PROFFERED BY: STAFF

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070297, 070298, & 070301-EI EXHIBIT 7
COMPANY FL PSC Staff
WITNESS Staff's Composite Exhibits-7 Stipulated
DATE 10/03/07

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company	)	Docket No. 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	)	Docket No. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company	)	Docket No. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company	)	Docket No. 070301-EI

VERIZON FLORIDA LLC'S OBJECTIONS AND RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1-7)

Verizon Florida LLC ("Verizon") hereby provides its objections and responses to the First Set of Interrogatories (Nos. 1-7) (the "Discovery Requests") served by Florida Public Service Commission Staff.

Interrogatory No.	Responses provided by:
1	John Plott, Section Manager - Network Engineering Richard Schweikert, Cable Splicer
2, 3, 4, 5	Chip Levick, Area Manager - Construction
6	Sanford Walker, Manager- Network Engineering
7	Raul Rivera, Section Manager - Network Engineering

GENERAL OBJECTIONS

1. Verizon objects to Staff's Discovery Requests and all Instructions and Definitions associated with those Discovery Requests to the extent they purport to impose obligations that are different from, or go beyond, the obligations imposed under Rules 1.280, 1.340, and 1.351 of the Florida Rules of Civil Procedures, and the Rules of the Florida Public Service Commission ("the Commission").

2. Verizon objects to the Discovery Requests and all Instructions and Definitions associated with those Discovery Requests to the extent they seek information outside the scope of the issues raised in this proceeding, and to the extent their principal purpose appears to be to harass Verizon and unnecessarily impose costs on Verizon.

3. Verizon objects to the Discovery Requests and all Instructions and Definitions associated with those Discovery Requests to the extent they seek documents or information protected by the attorney-client privilege, the attorney work-product doctrine, or any other applicable privileges or doctrines. Any inadvertent disclosure of such privileged documents or information shall not be deemed to be a waiver of the attorney-client privilege, attorney work-product doctrine, or other applicable privileges or doctrines.

4. Verizon objects to each Discovery Request to the extent that it is vague and ambiguous, particularly to the extent that it uses terms that are undefined or vaguely defined in the Discovery Requests.

5. Verizon objects to the Discovery Requests and all Instructions and Definitions associated with those Discovery Requests to the extent they seek

confidential business, financial, or other proprietary documents or information. Verizon further objects to the Discovery Requests to the extent they seek documents or information protected by the privacy protections of the Florida or United States Constitutions, or any other law, statute, or doctrine.

6. Verizon objects to the Discovery Requests to the extent they seek documents or information equally available to Staff as to Verizon through public sources or records or which is already in the possession, custody or control of the Florida Public Service Commission, because such requests subject Verizon to unreasonable and undue annoyance, oppression, burden, and expense.

7. To the extent Verizon responds to Staff's Discovery Requests, Verizon reserves the right to amend, replace, supersede, and/or supplement its responses as may become appropriate in the future. However, it undertakes no continuing or ongoing obligation to update its responses.

8. Verizon objects to the Discovery Requests and all Instructions and Definitions associated with those Discovery Requests to the extent that they seek to impose an obligation on Verizon to respond on behalf of subsidiaries, affiliates, or other persons that are not subject to the jurisdiction of this Commission on the grounds that such discovery is overly broad, unduly burdensome, oppressive, and not permitted by applicable discovery rules.

9. Verizon objects to the Discovery Requests to the extent they seek information that is not reasonably calculated to lead to the discovery of admissible evidence and not relevant to the subject matter of this arbitration proceeding.

10. Verizon objects to the Discovery Requests to the extent they are duplicative and overlapping, cumulative of one another, overly broad, and/or seek responses in a manner that is unduly burdensome, expensive, oppressive, or excessively time-consuming to Verizon.

INTERROGATORIES

1. What is the revised estimate of Verizon's cost and benefit information associated with the Storm Hardening Plans for each of the IOUs that reflect the impact of any supplements to the original hardening plans or information obtained through negotiations or discussions with each IOU.

RESPONSE:

Subject to and without waiving the general objections, Verizon responds as follows with respect to Progress Energy Florida, Inc. ("PEF"), Tampa Electric Company ("TECO") and Florida Power & Light Company ("FPL"):

- PEF has not provided information in its storm-hardening plan, the supplement to its storm hardening plan or in discussions with Verizon necessary for Verizon to estimate its costs associated with the plan. Verizon also does not have information that would enable it assess the benefits, if any, to Verizon of the plan.

- Based on TECO's storm hardening plan and additional information TECO has provided, Verizon has been able to develop the following high-level estimates of its transfer costs associated with the projects TECO has identified in its plan:

Tampa International Airport	$41,000
St. Joseph's Hospital (extreme wind pilot)	$8,700
Port of Tampa (extreme wind pilot)	$33,000
Louis Avenue 4kv Conversion	$20,457

At this stage, Verizon does not know if TECO will attempt to seek to impose other costs under the parties' joint-use agreement, and in any event such an attempt probably would result in a dispute between the parties. Verizon does not have information that would enable it to assess the benefits, if any, to Verizon of the plan.

- Based on the FPL's storm hardening plan and engineering detail FPL has provided concerning the two critical infrastructure projects that will affect

Verizon in 2007, Verizon has developed the following transfer cost estimates for those projects:

Manatee Memorial Hospital $1899
Sarasota Memorial Hospital $600

At this stage, Verizon does not know if FPL will attempt to seek to impose other costs under the parties' joint-use agreement with respect to these projects, and in any event such an attempt probably would result in a dispute between the parties. Although FPL has provided high-level information concerning its 2008 and 2009 critical infrastructure projects, that information is not sufficiently detailed for Verizon to develop cost estimates for them. FPL has not identified its 2008-2009 incremental hardening projects or provided information on the implementation of new design guidelines for poles that are set or replaced in conjunction with new construction, major planned work, relocation projects and daily work that is intended to involve the FPL distribution network to Extreme Wind Loading criteria over time. Verizon does not have information that would enable it assess the benefits, if any, to Verizon of the plan.

2. In responses to Staff's first set of interrogatories, FPL stated that it intends to replace 2,000 poles in 2007. What is Verizon's total estimated transfer cost associated with these poles assuming Verizon was attached to each pole being replaced?

RESPONSE:

Subject to and without waiving the general objections, Verizon responds as follows to Interrogatory No. 2 and its subparts:

The estimated cost is $444,720.

a. Please provide a detailed analysis of Verizon's total estimated transfer cost stated in Staff's Interrogatory No. 2.

RESPONSE:

Verizon's estimate assumes a "straight" transfer of its cable and associated hardware to 2,000 new wood distribution poles placed in the same line as the old poles and uses Verizon's average cost of $222.36 per pole. The average cost consists of one linemen working for 3 hours at a rate of $74.12 per hour.

b. Assuming FPL replaces the same number of poles in 2008 and 2009 as they project for 2007, what are Verizon's total estimated transfer costs for 2008 and 2009?

RESPONSE:

Using the same average cost estimate of $222.36 per pole, the costs would be as follows:

2008 - $444,720
2009 - $444,720

3. Staff estimates that PEF may replace approximately 1,375 poles in 2007. What is Verizon's total estimated transfer cost associated with these poles assuming Verizon was attached to each pole being replaced?

RESPONSE:

Subject to and without waiving the general objections, Verizon responds as follows to Interrogatory No. 3 and its subparts:

The estimated cost is $305,745.

b. Please provide a detailed analysis of Verizon's total estimated transfer cost stated in Staff's Interrogatory No. 3.

RESPONSE:

Verizon's estimate assumes a "straight" transfer of its cable and associated hardware to 1,375 new wood distribution poles placed in the same line as the old poles and uses Verizon's average cost of $222.36 per pole. The average cost consists of one linemen working for 3 hours at a rate of $74.12 per hour.

b. Assuming PEF replaces the same number of poles in 2008 and 2009 as staff projected PEF may replace for 2007, what are Verizon's total estimated transfer costs for 2008 and 2009?

RESPONSE:

Using the same average cost estimate of $222.36 per pole, the costs would be as follows:

2008 - $305,745
2009 - $305,745

4. In responses to Staff's first set of interrogatories, TECO has indicated that it will be replacing a total of 835 poles in 2007-2009. What is Verizon's total estimated transfer cost associated with these poles assuming Verizon was attached to each pole being replaced?

RESPONSE:

Subject to and without waiving the general objections, Verizon responds as follows to Interrogatory No. 4 and its subpart:

The estimated cost is $185,670.

c. Please provide a detailed analysis of Verizon's total estimated transfer cost stated in Staff's Interrogatory No. 4.

RESPONSE:

Verizon's estimate assumes a "straight" transfer of its cable and associated hardware to 835 new wood distribution poles placed in the same line as the old poles and uses Verizon's average cost of $222.36 per pole. The average cost consists of one linemen working for 3 hours at a rate of $74.12 per hour.

5. What other cost elements may Verizon incur in storm hardening efforts other than the pole transfer costs for each IOU?

RESPONSE:

Subject to and without waiving the general objections, when a new pole is placed adjacent to or out of line with an existing pole, the cables, risers, strand, down-guys, anchors or ground wires may no longer be long enough and may require modifications. Cost elements would include the placement of new materials and associated labor.

In addition to simple transfers (wood to wood) there may be additional time and material involved with transferring cable from a wood pole to a steel, concrete or fiberglass poles because the methods of attaching cable are different. Cost elements would include additional material and labor.

Moreover, at this stage, Verizon does not know if electric utilities will attempt to seek to impose other costs under the parties' joint-use agreements, and in any event such an attempt probably would result in a dispute between the parties.

6. What specific additional information, if any, is needed from each IOU that Verizon is attached to in order for Verizon to provide an estimate of cost benefit data for storm hardening projects in 2007, 2008 and 2009?

RESPONSE:

Subject to and without waiving the general objections, Verizon responds as follows with respect to PEF, TECO and PFL:

- To be able to provide high-level transfer cost estimates for the projects identified in PEF's storm-hardening plan in Verizon's service territory, Verizon would need route maps, a description of the poles affected by each project and a description of the storm-hardening techniques that PEF intends to use. For more accurate estimates, Verizon would require engineering detail for each project.

- For more accurate transfer estimates for the projects TECO has identified, Verizon would require engineering detail for each project.

- To be able to provide high-level transfer cost estimates for FPL's 2008 and 2009 critical infrastructure projects, Verizon would need a description of the poles affected by each project and the storm-hardening techniques the FPL intends to use. For more accurate estimates, Verizon would require engineering detail for each project. Because FPL has not identified additional projects (such as incremental storm-hardening projects in Verizon's service territory), such projects would need to be addressed in a petition to amend FPL's plan.

7. Is Verizon currently using the National Joint Utilities Notification System (NJUNS) to notify parties of construction activities?

RESPONSE:

Subject to the general objections, Verizon responds as follows to Interrogatory No. 7 and its subparts:

Yes.

a. If your response to Staff Interrogatory No. 7 is Yes, please give examples of the level of information Verizon exchanges using NJUNS.

RESPONSE:

In the NJUNS program, Verizon provides the address, power company pole number, if different from the address provided, and the nearest cross streets.

For one of the electric utilities, Verizon also provides a sketch if the request involves a Verizon work order. Normally, most of the activity is for transfer work required due to the replacement of a pole and involves multiple steps with various joint users or licensees, but information is also shared regarding NESC violations.

The priority level may also be indicated on a ticket. For instance, it usually is noted on an NJUNS ticket if the activity is a "rush," needs to be expedited, is a considerable safety concern, or provides notice that a major project or activity is

In NJUNS, when a particular step for a ticket is completed, the information is updated and the system automatically generates an email to the company indicated on the ticket for the next step. When the last step on a ticket is completed and updated in the system, an e-mail is automatically sent to the company originating the ticket so that the ticket can be closed.

Other descriptive information such as date, directions, or handling information for "rush" orders also can be indicated on a ticket.

b. If your response to Staff Interrogatory No. 7 is No, is Verizon planning on using NJUNS in the future for notifying parties of construction activities?

RESPONSE:

No response required.

c. If your response to Staff Interrogatory Number 7(b) is Yes, please describe how, when and with whom will Verizon use NJUNS to exchange information regarding construction activities.

RESPONSE:

No response required.

VERIFICATION

STATE OF FLORIDA)
) ss.
COUNTY OF HILLSBOROUGH)

BEFORE ME, the undersigned authority, personally appeared Frank App, who deposed and stated that the answers to the First Set of Interrogatories (Nos. 1-7) served on Verizon Florida LLC by the Staff of the Florida Public Service Commission in Docket Nos. 070297-EI, 070298-EI, 070299-EI and 070301-EI were prepared at his request and he is informed that the responses contained therein are true and correct to the best of his information and belief.

DATED at Tampa, Florida, this 24th day of September, 2007.

Frank App

Sworn to and subscribed before me this 24th day of September, 2007.

Teresa Ann Scobie
Notary Public
State of Florida

My Commission Expires:

TERESA ANN SCOBIE
MY COMMISSION # DD 566618
EXPIRES: October 21, 2010
Bonded Thru Notary Public Underwriters

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that copies of Verizon Florida LLC's Notice of Service and Responses to Staff's First Set of Interrogatories (Nos. 1-7) were sent via U.S. mail on September 25, 2007 to the parties on the attached list.

s/ Dulaney L. O'Roark III

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company	Docket No. 070297-EI Filed: September 25, 2007
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	Docket No. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company	Docket No. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company	Docket No. 070301-EI

NOTICE OF SERVICE OF VERIZON FLORIDA LLC'S RESPONSES TO STAFF'S FIRST SET OF INTERROGATORIES (NOS. 1-7)

NOTICE IS HEREBY GIVEN that Verizon Florida LLC, by and through its undersigned counsel, has served its responses to Staff's First Set of Interrogatories (Nos. 1-7) via electronic mail and U.S. mail on September 25, 2007 to Keino Young, Staff Counsel, Florida Public Service Commission, 2540 Shumard Oak Boulevard, Tallahassee, FL 32399-0850.

A copy of this Notice was also sent via electronic mail on September 25, 2007 to the Office of the Commission Clerk at the Commission. Further service on other parties of record is as set forth on the Certificate of Service, appended hereto.

Respectfully submitted on September 25, 2007.

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Attorney for Verizon Florida LLC

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BEFORE THE PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company.	DOCKET NO. 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	DOCKET NO. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company,	DOCKET NO. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company	DOCKET NO. 070301-EI

TELEPHONIC DEPOSITION OF SANFORD WALKER

Tuesday, September 25, 2007
1:00 p.m. - 1:51 p.m.

700 Universe Boulevard
Juno Beach, Florida 33408

Reported By:
Pamela J. Sullivan, RPR, FPR
Notary Public, State of Florida
Esquire Deposition Services
West Palm Beach Office Job #893057

APPEARANCES:

On behalf of FPL:

Hearing Exhibit - 001036

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Also Present:
Frank App, Verizon
John Christian, Verizon
Roberto L. Valdez, FPL
Teresa Ann Scobie, Notary
(Present initially to swear in the Witness)

- - -

I N D E X

- - -

WITNESS:	DIRECT	CROSS	REDIRECT	RECROSS
SANFORD WALKER				
BY MR. BUTLER	6			

Hearing Exhibit - 001037

BY MR. MANN 25

P R O C E E D I N G S

- - -

Deposition taken before Pamela J. Sullivan, Registered Professional Court Reporter and Notary Public in and for the State of Florida at Large, in the above cause.

- - -

MR. BUTLER: Let's see who is on, and we may well just be in a position to go ahead and start.

MR. O'ROARK: Okay. Well, I'll start. This

Hearing Exhibit - 001038

is De O'Roark with Verizon, and with me are the witness, Sanford Walker and Terry Scobie.

MR. APP: And Frank App, listening in.

(Discussion held off the record.)

MR. BUTLER: He's not making appearance. He works with Verizon. He's just listening in to the call. You don't need to list him as -- you can have just an also present.

Similarly with Bob Valdes, the person from FPL, who's...

(Discussion held off the record.)

MR. BUTLER: Okay, Bob. Go ahead.

MR. VALDES: Okay. This is Bob Valdes. I am not making an appearance. I'm just listening in -- from Florida Power and Light Company.

MR. SEIVER: Okay. It's John Seiver. I am making an appearance for FCTA.

MR. BUTLER: Okay.

MR. MANN: This is Rick Mann with Commission Staff. I am making an appearance. We do have a cross-notice in this deposition.

MR. BUTLER: Okay.

MR. MANN: And that's M-a-n-n. And I do need to get information, of course, regarding the Court Reporter at some convenient time.

(Discussion held off the record.)

MR. BUTLER: Did somebody just join?

MR. CHRISTIAN: Hi, John. It's Dave Christian with Verizon.

Hearing Exhibit - 001039

MR. BUTLER: Okay. Hi, Dave.

MR. CHRISTIAN: Just like the religion.

(Discussion held off the record.)

MR. BUTLER: And do you want to give contact information for yourself now? John Seiver had requested it -- or maybe it was Rick.

(Discussion held off the record.)

MR. BUTLER: May we have the witness sworn, please?

MS. SCOBIE: This is Terry Scobie. We'll do the honors.

Thereupon,

SANFORD WALKER,

having been first duly sworn or affirmed, was examined and testified as follows:

MR. BUTLER: All right. And you will -- Terry, you will fill out the certificate of oath and, I guess, probably the easiest, if you have the facilities, is just scan and e-mail it to Ms. Sullivan.

MS. SCOBIE: Okay. Sure will.

(Discussion held off the record.)

DIRECT EXAMINATION

BY MR. BUTLER:

Q. Good afternoon, Mr. Walker. I am John Butler, attorney for Florida Power and Light in this case, and we initially noticed this deposition. I'll be asking you a few questions this afternoon.

A. Okay.

Hearing Exhibit - 001040

Q. Have you had your deposition taken before?
A. Meaning have I ever been to a deposition?
Q. Yeah, have you ever had your deposition taken, not necessarily in this case, just in any case?
A. No.
Q. No? Okay.
Let me explain a little bit about the process,

then, and if you have any further questions about it, you can ask. I will be asking you questions. Your attorney may at times raise objections, but in most instances, unless he tells you otherwise, you can answer the question anyway; although, I may choose to rephrase the question in light of the objection.
If you have any questions or confusion about my questions because they're not clear to you, please let me know, and I will try to rephrase the question. If you don't do that, if you answer the question, we and the record will be assuming that you understood the question and knew what it was that was being asked. Is that clear?
A. Yes, that's clear.
Q. Okay. And at any point, if you need to take a break, feel free. Just ask -- excuse me -- just ask for the opportunity or ask your attorney, and he will, and we'll certainly accommodate you.
My one request is that, if there is a pending question, unless there is a concern about something like privilege or confidentiality, I would ask that you complete your answer to the question before beginning a

break.

A. Okay.

Q. Okay. Let me ask you this: What materials do you have with you at the deposition?

A. Okay. In front of me I have a copy of my direct testimony. And I also have a copy of the process within the process, the K1. And I also have a copy of the PFC rules regarding the -- gosh, losing my train of thought here, I apologize -- but, basically, a copy of the PFC rules here. And I also have a copy of Progress Energy's storm hardening plan, as well as their testimony. A copy of the -- of Manuel Miranda's testimony. I also have a copy of TECO's Mr. Haines' testimony here.

Q. I'm sorry. Let me stop you for just a second. Mr. Miranda's testimony, do you have both his direct and rebuttal testimony with you?

A. Just one second.

MR. SEIVER: Mr. Butler, if he doesn't, I do, if that helps.

MR. BUTLER: Okay.

BY MR. BUTLER:

Q. Initially, I just thought -- I assumed that Mr. Walker brought some materials with him to the deposition, and I just wanted to confirm whether --

A. If I had --

Q. -- Mr. Miranda's rebuttal testimony was part of what he had brought.

A. I don't have the rebuttal.
Q. Okay. So you have his direct, but not his rebuttal with you?
A. Correct.
Q. And you have Mr. Haines' direct testimony?
A. Let me just double-check.
Yes, I do have his direct testimony.
Q. And anything else?
A. I also have a copy of TECO's rebuttal testimony, as well.
Q. Okay. Anything else?
A. Let's see. I have a copy of both FPL's and also TECO's plan.
Q. Okay.
A. Or at least from a technologic standpoint.
(Discussion held off the record.)
THE WITNESS: I'm sorry. I have a copy of FPL's electric infrastructure storm hardening plan.
BY MR. BUTLER:
Q. Okay. Anything else?
A. I believe that's everything.
Q. Okay. I'd like to have you turn to Page -- I guess it's Page 2. It's -- I have never noticed this before.
As I have this --

MR. BUTLER: And, Mr. O'Roark, maybe you can confirm if it's the same with you. I have a copy of Mr. Walker's testimony, which the first page

Hearing Exhibit - 001043

doesn't have a number. It's a cover page. The second page doesn't have a number either. And then the next page after that is three.

But I think that that's -- you know, the page that has testimony on it and no number is really the first page of testimony, but I guess it's numbered Page 2; is that right?

MR. O'ROURKE: That appears to be the same version we're looking at.

MR. BUTLER: Okay. The last words on that is Florida Power and Light Company, and then the first words on the next page is paren, quote, FPL?

MR. SEIVER: Yes.

MR. BUTLER: Okay. All right.

BY MR. BUTLER:

Q. Do you have that in front of you, Mr. Walker?

A. Yes, I do.

Q. Okay. Now, you have a Bachelor of Science Degree in electrical engineering from the University of Florida. Can you tell me what area of concentration or specialization you pursued in your electrical engineering degree?

A. The concentration that I pursued was life science.

Q. Life science?

A. Yes.

Q. Okay. As in biology?

A. Yes.

Q. But your degree was in electrical engineering?

A. That's correct.

Q. Okay. Tell me about that. What does the life science concentration within electrical engineering consist of?

A. It consists of studying both what we call core biology and also in study of organic chemistry, and melding both, I guess you might call, science and medicine together in that concentration. Similar to biomedical engineering.

Q. Okay. Did you take any courses in power system design in your course of study at Gainesville?

A. Yes.

Q. And what courses did you take in power system design?

A. It was an introductory course in power.

Q. Okay. Any other courses in power system design?

A. No.

Q. Okay. Did you take any courses that would cover the subject -- I'm not sure quite how to describe them as academic courses -- but courses that would cover the subject of evaluating and designing electrical distribution systems from a strength perspective?

A. Could you rephrase the question, please.

Q. Did you take any courses that would have covered the subject of evaluating and designing electric distribution systems from a strength perspective?

A. No.

Q. Okay. And you joined Verizon's predecessor,

GTE, directly out of school; is that right -- directly out of college?

A. That's correct.

Q. Okay. So all of your employment experience has been with GTE and then Verizon?

A. That's correct.

Q. Okay. Tell me about your position as manager of network engineering. What responsibilities do you have there?

A. I have the responsibility of the telephone engineering and design activity in the -- what we call the coastal area, which would be the Pasco County, Pinellas County, Manatee and Sarasota County.

Q. I'm sorry. You said the telephone

engineering?

A. Yes.

Q. What does that consist of?

A. That consists of the engineering of the telephone network.

Q. Okay. Does that entail the engineering of the poles that support the lines and cables providing telephone service?

A. Yes.

Q. So you're responsible for designing -- or determining that those poles meet necessary NESC or other strength requirements?

A. Yes.

Q. Okay. Are you a -- do you serve on any of the NESC committees or subcommittees on Verizon's behalf?

A. No.
Q. Do you attend NESC committee or subcommittee meetings on Verizon's behalf?
A. No.
Q. This is probably clearer from your description of your background and experience, but is it true that you do not have any experience in evaluating or designing electric distribution systems?
A. Could you rephrase that one more time, please.
Q. Is it true that you do not have any experience

in evaluating or designing electric distribution systems?
A. True.
Q. Have you had any involvement in doing storm restoration work with respect to the Verizon system, or GTE system before it?
A. Any storm restoration work?
Q. Yeah.
A. No.
Q. Have you ever conducted any forensic analyses or investigations of storm damage to GTE or Verizon facilities?
A. No.
Q. At the time that you had prepared your direct testimony that was filed on September 7, what FPL documents had you reviewed?
A. At the time of my testimony I had reviewed the exhibit from the witness, from Manuel Miranda.
Q. The exhibit you're referring to is what?

Hearing Exhibit - 001047

A. I believe it's Docket Number 070301-EI.
Q. I'm sorry. Mr. Miranda's testimony in that docket has three exhibits attached to it, and you're referring to, it sounded like, exhibit, singular. And I was wondering --
A. Oh, my apology. It was a copy of his direct

testimony.
Q. Okay. And did that review include a review of the exhibits that were attached to it?
A. It, meaning the storm hardening plan?
Q. Yeah, it had the storm hardening plan and the critical infrastructure projects to be completed in 2008 and 2009, and then the Davies consultant storm pole replacement analysis?
A. Yes.
Q. Okay. Hold on just one second.
Would you turn to Mr. Miranda's Exhibit MBM2. To help you out, this is actually pretty close to the back. I think it starts four pages from the back of his testimony, at least as I have it here.
A. Okay.
Q. Do you have that?
A. Yes.
Q. Did you undertake an evaluation of this list of 2008 and 2009 CIF projects to determine which of these affect Verizon's service territory?
A. No.
Q. Okay. Since the time that you filed your testimony, have you reviewed any other documents of

FPL's?

A. The rebuttal testimony.

Q. And which rebuttal testimony is that?

A. From Manuel Miranda.

Q. Okay. Did you review the rebuttal testimony of Mr. McEvoy, John McEvoy?

A. No.

Q. Okay. Mr. Miranda's rebuttal testimony is accompanied by a series of three CDs, exhibits that were identified as MBM4, 5 and 6, and at least the versions for everybody but the clerk's office were on CDs for convenience.

Did you review any of those CDs, Mr. Walker?

A. Can you clarify what was on the -- what information would have been on there, on those CDs?

Q. Sure. Well, first of all, do you recognize them by that reference as exhibits to his deposition --

A. No.

Q. -- oh, I'm sorry -- to his rebuttal testimony?

A. No.

Q. Okay. Well, if you look at his rebuttal testimony, Page 1, you will see that MBM4 is a set of 2007 aerial maps and engineering drawings for 2007 CIF and community projects; do you see that?

A. Uh-huh.

Q. And then MBM5, balance of 2007 engineering drawings for 2007 CIF and community projects; do you see

Hearing Exhibit - 001049

that?

A. Yes.

Q. And then, finally, MBM6, primary map drawings for 2008 and 2009 CIF projects.

Have you reviewed any of those three exhibits, the CDs that they represent?

A. No.

Q. Okay. Let me ask you to turn, please, to Page 6 of your testimony. On Page 6, starting on line 18, there's a question about whether FPL's critical infrastructure project should be included in an EWL pilot project. Do you see that?

A. Yes.

Q. And I gather from your answer a moment ago, you've not looked at the primary map drawings for the 2008 or 2009 CIF projects that were Mr. Miranda's Exhibit MBM6, and did not evaluate whether any of the listed projects on his MBM2 are in your service territory for 2008/2009; is that correct?

A. Can you repeat one more time, please, just to make sure I understood the question.

Q. Okay. From your earlier answers, am I correct that you've not reviewed Mr. Miranda's Exhibit MBM6, which is primary map drawings for 2008 and 2009 CIF projects, and you did not review Mr. Miranda's Exhibit

MBM2, which is a list of 2008 and 2009 CIF projects, to determine if any of those projects are in the Verizon service territory?

Hearing Exhibit - 001050

A. Correct.

Q. So would it be fair to say that there might be information about the detail concerning FPL's 2008/2009 critical infrastructure projects that is in Verizon's possession, but that you have not yet evaluated?

A. I have not personally evaluated, yes. I have not evaluated the information.

Q. Okay. So you don't know whether that information would or wouldn't address the concern you express on Page 6 of your testimony about not having enough information on FPL's 2008 and 2009 CIF projects to know whether they should be included in an EWL pilot project; correct?

A. Yes.

Q. Okay. Let me ask you to turn to Page 7 of your testimony.

You -- on line six, you have a question and answer that runs down to line 11: "Should incremental hardening projects in Verizon's service territory be included in a pilot project?"

Your answer is: "No, based essentially on not having received any information about them"; is that

correct?

A. That's correct.

Q. Okay. Would you look at Mr. Miranda's rebuttal testimony again, the references there on Page 1 to MBM4 and MBM5. Do you see that?

A. Yes.

Q. Now, this identifies these exhibits, at least,

as being aerial maps and engineering drawings for 2007 CIF and community projects. Do you see that?

A. Yes.

Q. All right. Are you aware that in FPL's infrastructure hardening plan, community projects are those projects that are intended to be hardened using the incremental hardening approach?

A. Yes.

Q. Okay. So would you agree, at least by title, that these exhibits, MBM4 and MBM5, are identified as including aerial maps and actual engineering drawings for the community projects, meaning what you described in your testimony on Page 7 as the incremental hardening projects?

A. The aerial maps and drawings that Mr. Miranda is alluding to appear to allude to the 2007 CIF and community projects, which may include incremental hardening.

Q. But you haven't looked at those CDs; have you?

A. No.

Q. Would you look at Page 17 of Mr. Miranda's rebuttal testimony.

A. Okay.

Q. If you look on line 20, this is a discussion --

MR. BUTLER: Hello? Did somebody just join?

(Discussion held off the record.)

BY MR. BUTLER:

Q. If you look on line 20, this discusses

Hearing Exhibit - 001052

specifically Exhibit MBM4 on aerial maps and available detailed engineering drawings for all 2007 EWL, CIF and community hardening projects. This information was provided to all interested parties in April 2007.

Do you see that?

A. Yes.

Q. Okay. Do you have any reason to doubt that this information was provided to Verizon in April of 2007?

A. No.

Q. And then, similarly, you'll see the reference to Exhibit MBM5, which was provided in a CD to all interested parties in August 2007, contains the detailed engineering drawings for all 2007 EWL, CIF and community

projects that were not available in April of 2007.

Do you have any reason to doubt that the CD that's identified as MBM5 was provided to Verizon in August 2007?

A. No.

Q. But you did not review that information to determine whether, at least for 2007, you could find enough detail to take a position on including FPL's community projects or, as you describe them, incremental hardening projects, as part of a pilot project for FPL's plan; correct?

MR. O'ROURKE: I'm going to object to the question. Are you assuming that FPL identified any incremental storm hardening projects in Verizon's service territory?

MR. BUTLER: Well, I am suggesting that the information was available for Mr. Walker to determine whether there were or weren't any in the service territory.

MR. O'ROURKE: Are you representing to him that there were incremental projects in Verizon's territory for him to review?

MR. BUTLER: Well, I'm representing to him -- let me just rephrase the question.

BY MR. BUTLER:

Q. Would it be true, Mr. Walker, that you -- at the time you prepared your testimony, you had not reviewed the CDs that are identified as MBM4 and MBM5 and, therefore, would not know whether those CDs contained information on any incremental hardening or community projects that FPL would have intended to implement in 2007 for Verizon's service territory?

A. That's correct.

Q. On Page 7, further down, you -- starting on line 13, you say that: "FPL's proposal to modify its design guidelines for new construction, major planned work, relocation projects and daily work activities should not be approved for the reasons discussed by Dr. Slavin."

Do you see that?

A. Yes.

Q. Okay. Have you done any independent evaluation of Dr. Slavin's work?

A. No.

Q. Have you had any independent discussions with NESC committee members about Dr. Slavin's conclusions in his testimony?

A. No.

Q. Okay. So would it be fair to say that for

this purpose you are really relying on Dr. Slavin's opinion, rather than forming your own opinion as to the validity of FPL's design guidelines?

A. I am relying on Dr. Slavin's expertise in this matter.

Q. Okay. Have you done any evaluation based on the information that is available to Verizon at this point of what Verizon expects it will cost to accommodate FPL's storm hardening plan activities in the time period 2007 through 2009?

A. Can you rephrase that again, please.

Q. Have you made any sort of evaluation of the cost to Verizon of FPL's -- implementing FPL's storm hardening plan in Verizon's service territory for the years 2007 through 2009?

A. Yes.

Q. And what do you expect the cost to be for that time period?

A. Honestly, the cost I don't recall offhand.

Q. Okay. Did you prepare the cost estimate, or somebody else did, and you're just aware of it?

A. There was a cost estimate that was prepared independent of me.

Q. Okay. And do you know who prepared that?
A. Not offhand, no.

MR. BUTLER: Mr. O'Roark, may we get that cost estimate as a late-filed exhibit to Mr. Walker's deposition?

MR. O'ROARK: Mr. Butler, Verizon is responding to Staff interrogatories to date. It will provide that information.

MR. BUTLER: Okay. So this will be in the Staff -- the responses to Staff interrogatories?

MR. O'ROARK: Yes, sir.

MR. BUTLER: All right. Well, with that representation, I will withdraw the request for the exhibits.

And I believe that's all of my questions. Thank you, Mr. Walker.

THE WITNESS: Thank you.

MR. BUTLER: Does anyone else have questions for Mr. Walker?

MR. MANN: Yes. John, this is Rick Mann with the Florida Public Service Commission Staff.

CROSS EXAMINATION

BY MR. MANN:

Q. Good afternoon, Mr. Walker. I'm an attorney with the Commission Staff, and I do have a few questions for you, very few.

And we will -- I will stay with the

Hearing Exhibit - 001056

instructions, cautions that Mr. Butler provided to you. If there's any confusion over any of the questions that I ask, please let me know, and I will rephrase.

We are on the telephone. I didn't notice any drop in parts of sentences earlier, so I presume that's going well.

And if you will turn to your testimony, on Page 4 of your testimony, Mr. Walker --

A. Okay.

Q. -- if you look at line seven through 11. And you state there that: "Verizon requests that TECO's plan not be approved in its current form because it purports to impose pole attachment terms and conditions on attachers, rather than following the parties' existing joint use agreement."

What is the date of the existing joint agreement that Verizon has with TECO?

A. I'm not aware of the date of that particular joint use agreement.

Q. Are you aware of any joint use agreements between Verizon and TECO?

A. Can you elaborate, please?

Q. Have you reviewed any joint use agreements whatsoever?

A. No.

Q. Okay. Can you describe for me in more detail, if you will, the reference conflict that you mention there between the TECO's plan and the existing joint use agreements?

A. Okay. Well, what I can gather from what TECO is referring to, it would appear that some of these items may or may not be covered in our joint use agreement, in regards to the auditing of a pole, and also what happens when there is findings on pole attachments.

Q. Have there been any recent discussions or conflicts, efforts to revise the joint use agreement?

A. I'm not aware of that.

Q. Has this concern of yours been expressed to TECO management regarding the conflict between imposing pole attachment terms and conditions, rather than following existing joint use agreements?

A. I have not directed that to TECO management.

Q. Do you know if anyone else with Verizon has addressed that issue with TECO management?

A. I am not aware.

Q. If you will turn to Page 5 for me, please, Mr. Walker.

Now, on line 20 -- beginning line 20, you express another concern in your testimony that: "TECO

may attempt to claim that a Verizon attachment which was within the loading requirements for Grade C pole is responsible for overloading the pole when the Grade B," as in boy, "criteria are applied retroactively."

A. Uh-huh.

Q. Can you give me an example or a hypothetical that might describe that situation for me so that I can understand what you're suggesting there, please?

Hearing Exhibit - 001058

A. That's just suggesting that, if the criteria being applied to the pole, when the pole initially met the correct -- excuse me -- met the Grade B criteria, basically, that there isn't any retroactive penalties, because now the pole now fails that given criteria. It met it originally, but now it fails that criteria.

Q. Now, are you describing the situation now where TECO and Verizon could simply have different views or calculations about the load that's placed on a pole?

A. Yes.

Q. Let me give you kind of a two-part question. First part is: Assume that we have a pole that's owned by Verizon, and TECO has an attachment. If the latest attachment to that pole were to come into question regarding overloading, but a year after that attachment was placed on that pole, how would Verizon and TECO go about documenting who added what load, exactly how much

load was added, and when was it added?

MR. O'ROARK: Object to the form of the question. De O'Roark, I'm objecting to the form of the question.

Mr. Walker, if you understand it, you can respond.

MR. MANN: Mr. O'Roark, is the objection to the multipart?

MR. O'ROARK: Yes.

MR. MANN: Yes, sir. Let me rephrase that.

BY MR. MANN:

Q. Again, we've got a pole that's owned by

Verizon, and TECO has an attachment to that pole. The latest attachment were to come into a question -- come into question, rather, regarding the overloading concern, but a year later, after a passage of some time. How would Verizon and TECO go about documenting who added that load to the pole?

A. Would that not follow the joint use guidelines?

Q. I don't know about the joint use guidelines. But what I'm asking is: What would Verizon and TECO -- what sort of record would Verizon and TECO rely on to make a determination as to who added the latest load on that pole?

A. I don't know.

MR. BUTLER: Somebody is writing very near their speaker phone.

MR. MANN: Sorry, John.

BY MR. MANN:

Q. And would that be the same answer for how much of a load was imposed on that pole, that you don't know what sort of records would exist to document the load itself?

A. That's correct.

Q. And would that also -- that same answer apply if I were to ask you what records might exist for TECO and Verizon to determine when that load was applied to the pole?

A. Yes.

Q. And would those same answers obtained, if I

were to flip that hypothetical around to say that it's a TECO-owned pole, and Verizon attaches to that pole?

A. I don't know.

Q. The records would be the same, but you don't know what records would exist?

A. In terms of what recordkeeping TECO may have.

Q. How about Verizon?

A. That I don't know.

Q. Have you, on behalf of Verizon, presented to

the -- any of the IOUs the issues that you describe here, particularly on Page 5 that we just covered?

A. No.

Q. And the IOUs failed to put forth a good-faith effort to resolve any of the concerns brought to them by Verizon?

A. That I can't answer.

Q. Can't answer because you do not know?

A. I do not know.

Q. Okay. Have the IOUs failed to provide detailed information to address the cost in benefits of their hardening plans?

A. Can you repeat that one more time, please.

Q. Yes, sir, certainly.

Have the IOUs, the four electrics, failed to provide detailed information addressing the costs and benefits of their individual respective hardening plans?

A. Have all of the IOUs failed?

Q. Have any of them failed?

A. That I can't answer.

Q. Because you don't know?
A. I don't know.
Q. Okay.
MR. MANN: All right. I don't believe I have any other questions for you, Mr. Walker.

Thank you very much.
MR. O'ROARK: Does anyone else --
MR. SEIVER: John Seiver for FCTA, and we had cross-noticed Mr. Walker, as well. And I have no questions for Mr. Walker.
MR. O'ROARK: Does anyone else have questions? Okay. May we go off the record, please.
(Discussion held off the record.)
(Whereupon, the Deposition was concluded at 1:50 p.m.)

- - -

25

C E R T I F I C A T E

THE STATE OF FLORIDA

COUNTY OF PALM BEACH

I, Pamela J. Sullivan, Registered Professional Court Reporter and Notary Public in and for the State of Florida at large, do hereby certify that I was authorized to and did report said deposition in stenotype; and that the foregoing pages are a true and correct transcription of my shorthand notes of said deposition.

I further certify that said deposition was taken at the time and place hereinabove set forth and that the taking of said deposition was commenced and completed as hereinabove set out.

I further certify that I am not attorney or counsel of any of the parties, nor am I a relative or employee of any attorney or counsel of party connected with the action, nor am I financially interested in the action.

The foregoing certification of this transcript does not apply to any reproduction of the same by any means unless under the direct control and/or direction of the certifying reporter.

Dated this 1st day of October, 2007.

_____

Pamela J. Sullivan, RPR, FPR

Job #893057

561.659.4155 ESQUIRE DEPOSITION SERVICES 800.330.6952

Hearing Exhibit - 001063

October 1, 2007

SANFORD WALKER
c/o DULANEY O'ROURKE, III, ESQUIRE
Verizon Florida, LLC
6 Concourse Parkway
Atlanta, Georgia 30328

IN RE: REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN JOB NO.: 893057

Dear Mr. Walker:

Please take notice that on Tuesday, the 25th of September, 2007, you gave your deposition in the above-referred matter. At that time, you did not waive signature. It is now necessary that you sign your deposition.

As previously agreed to, the transcript will be furnished to you through your counsel or counsel for Verizon. Please read the following instructions carefully:

At the end of the transcript you will find an errata sheet. As you read your deposition, any changes or corrections that you wish to make should be noted on the errata sheet, citing page and line number of said change. DO NOT write on the transcript itself. Once you have read the transcript and noted any changes, be sure to sign and date the errata sheet and return these pages to me.

If you do not read and sign the deposition within a reasonable time, the original, which has already been forwarded to the ordering attorney, may be filed with the Clerk of the Court. If you wish to waive your signature, sign your name in the blank at the bottom of this letter and return it to us.

Very truly yours,

_____
Pamela J. Sullivan, RPR, FPR
ESQUIRE DEPOSITION SERVICES, INC.
515 North Flagler Drive
West Palm Beach, Florida 33401

I do hereby waive my signature.

_____
SANFORD WALKER

C E R T I F I C A T E

- - -

THE STATE OF FLORIDA

COUNTY OF PALM BEACH

CERTIFICATE OF OATH

STATE OF FLORIDA

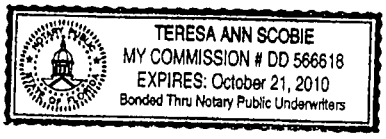
COUNTY OF HILLSBOROUGH

I, the undersigned authority, certify that Sanford Walker personally appeared before me at Tampa, Florida and was duly sworn by me to tell the truth.

WITNESS my hand and official seal in the City of Tampa, County of Hillsborough, State of Florida, this 25th day of September, 2007.

Teresa Ann Scobie

Notary Public
State of Florida



Personally known X or produced identification_____

Type of Identification produced_____

I hereby certify that I have read the foregoing deposition by me given, and that the statements contained herein are true and correct to the best of my knowledge and belief, with the exception of any corrections or notations made on the errata sheet, if one was executed.

Dated this ____ day of _____, 2007.

_____
SANFORD WALKER

Job #893057

E R R A T A S H E E T

IN RE: REVIEW OF 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN
CR: PAMELA J. SULLIVAN, RPR, FPR
DEPOSITION OF: SANFORD WALKER
TAKEN: September 25, 2007 JOB NO.: 893057

DO NOT WRITE ON TRANSCRIPT - ENTER CHANGES HERE

PAGE #	LINE #	CHANGE	REASON

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Please forward the original signed errata sheet to this office so that copies may be distributed to all parties.

Under penalty of perjury, I declare that I have read my deposition and that it is true and correct subject to any changes in form or substance entered here.

DATE: _____

SIGNATURE OF DEPONENT:_____

SCANNED

TAMPA ELECTRIC COMPANY
DOCKET NO. 070297-EI

EXHIBIT OF

REGAN B. HAINES

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070297-EI EXHIBIT 8
COMPANY TECO (Direct)
WITNESS Regan B. Haines (RBH-1)
DATE 10/02 + 03/07

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Document 2	Cost and Benefits Matrix filed July 30, 2007
Document 3	Process to Engage Third Party Attachers

TAMPA ELECTRIC COMPANY
DOCKET NO. 070297-EI
DOCUMENT 1
EXHIBIT ____ (RBH-1)

2007 – 2009

Storm Hardening Plan

Docket No. 060172-EI
Docket No. 060173-EI

Filed: May 7, 2007

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1 INTRODUCTION

Tampa Electric's 2007 - 2009 Storm Hardening Plan is an important part of Tampa Electric's multi-pronged approach to enhance the reliability of the overhead and underground electrical transmission and distribution facilities and has been developed in conformance to Florida Public Service Commission ("FPSC") Order No. PSC-07-0043-FOF-EU issued January 16, 2007.

Tampa Electric serves 654,000 customers and its service area covers 2,000 square miles in West Central Florida, including all of Hillsborough County and parts of Polk, Pasco and Pinellas Counties. Tampa Electric's transmission system consists of approximately 1,200 miles of overhead facilities (26,000 poles) and 14 miles of underground facilities. The company's distribution system consists of approximately 6,100 miles of overhead lines (303,000 poles) and 7,300 miles of underground lines. Tampa Electric also has approximately 330,000 authorized third party attachments on its transmission and distribution poles.

2 PURPOSE

The purpose of this plan is to define the design criteria, construction standards, policies and procedures utilized for all new transmission, distribution and substation facilities constructed in Tampa Electric's service territory. This plan will also describe in detail the company's deployment strategy to achieve the plan's objectives, which include the costs and benefits expected, and the benefits and impacts to third party attachers. Finally, the plan will outline the company's pole attachment standards and procedures for third party attachers ("joint users").

3 SCOPE

This plan is intended to apply to all new construction and maintenance of transmission, distribution and substation facilities by Tampa Electric in its service territory and all third parties who access and attach to Tampa Electric facilities subsequent to the Commission-approved date of the plan.

4 REFERENCES

The following resources are referenced in this plan:

- 2007 National Electrical Safety Code ("NESC")
- National Hurricane Center Database
- Florida State Building Code
- Hillsborough County Wind Maps
- Tampa Electric's 2006 Storm Implementation Plan
- *Distribution Engineering Technical Manual ("DETM")*
- *Standard Electrical Service Requirements ("SESR")*
- *General Rules and Specifications ("GR&S")*
- *General Rules and Specifications Underground ("GR&S-UG")*
- *Approved Materials Catalog ("AMC")*
- *Hillsborough County Flood Hazard Maps*

5 DEFINITIONS

Transmission – electric facilities operating at 69 kV or above.

Distribution – electric facilities operating below 69 kV.

Chromated copper arsenate ("CCA") - A chemical wood preservative containing chromium, copper and arsenic. CCA is used in pressure treated wood to protect wood from rotting due to insects and microbial agents.

ACSR (aluminum conductor, steel reinforced) - ACSR conductor, a stranded steel core carries the mechanical load, and layers of stranded aluminum surrounding the core carry the current.

AAAC - All aluminum alloy conductor.

Attachers – Any entity that has placed any facility on a Tampa Electric owned pole. Facilities may include but are not limited to cables, messenger wires, centenary support wires, power supplies, equipment boxes, grounding wires or lugs, brackets, guys, etc.

6 CONSTRUCTION STANDARDS, POLICIES, PRACTICES and PROCEDURES

6.1 Design Philosophy

A basis of Tampa Electric's construction standards, policies, practices and procedures is the NESC. From this foundation, the company's philosophy is to implement the safest, reliable and most cost effective service possible to its customers. The two main elements of the NESC address minimum clearances and loading criteria required to maintain a safe system for both the public and the workers who construct and maintain the system. Tampa Electric's construction standards and policies meet or exceed all minimum NESC clearance requirements. In addition, as part of the NESC Rule 250 which addresses pole loading requirements, the United States is divided into three loading districts; Heavy, Medium and Light (see Fig. 1). The Tampa Electric service area is located in the Light loading district, which assumes no ice build up and with a wind pressure of nine pounds per square foot. The nine pound wind corresponds to approximately 60 mph. The Light loading district wind speed corresponds to a wind pressure of more than twice that in the Heavy or Medium districts due to the strong (non-linear) dependence of the wind force on wind speed (The wind pressure is proportional to the square of the wind speed.). Another part of the NESC Rule 250B requires overload factors to be applied to the calculated wind forces to provide a conservative margin of safety when selecting appropriate pole sizes. A factor of two to one is applied to Grade C construction and a factor of four to one is applied to Grade B construction. The effective wind speed of Grade B new construction is approximately 116 mph. According to the NESC, Grade B wind

loading criteria must be applied when constructing facilities less than 60 feet in height when crossing railroads, bridges and highways.

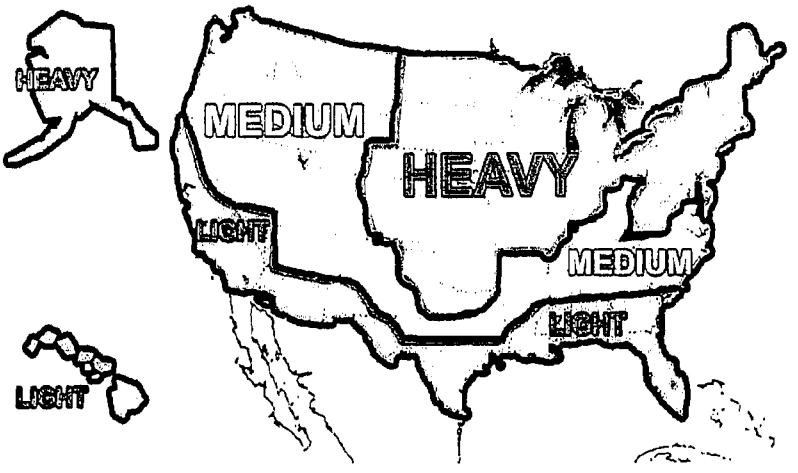


Fig.1- NESC General loading map of United States with respect to loading of overhead lines

The NESC also specifies an extreme wind pole loading criteria for all facilities constructed that are 60 feet in height or greater. The NESC provides a wind loading map that indicates the wind speed criteria for each area of the country. This same criteria and regional boundaries, developed by the American Society of Civil Engineers ("ASCE"), are utilized by the state of Florida and Hillsborough County for building code requirements. Tampa Electric's service territory is divided into two wind regions (see Fig. 2). The western half is in 120 mph zone and the eastern half is

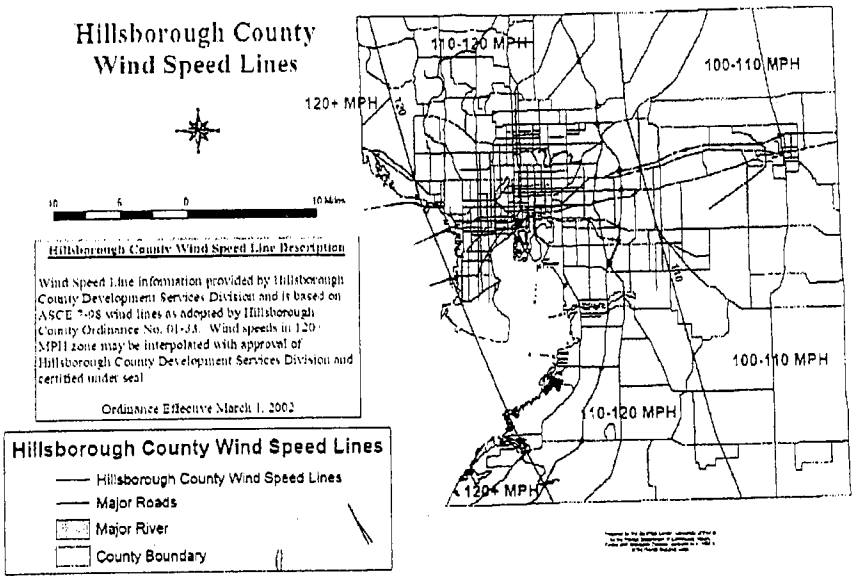


Fig. 2 - Hillsborough Wind-Borne Debris Region

in the 110 mph zone. It should also be noted that the Florida Building Code wind-borne debris region shown in Fig. 3 is the area where winds are greater than 120 mph. This wind-borne debris region is located outside of Tampa Electric's service territory.

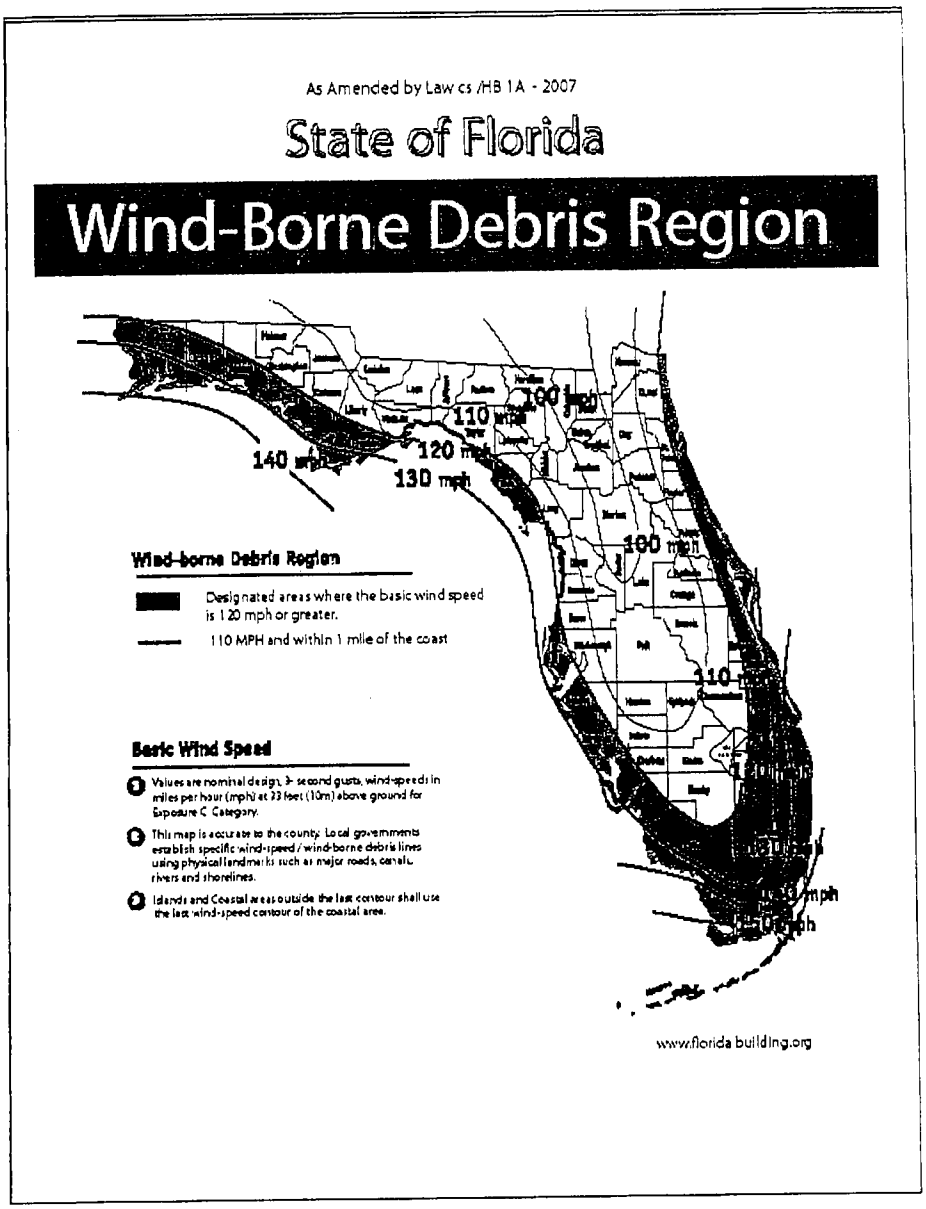


Fig. 3 - Florida Wind-Borne Debris Region

6.1.1 Experience with Major Storm Events

The company relies heavily on its experiences when developing and modifying its construction standards, policies, practices and procedures. A major component of this philosophy is experiences gained from major storm events and evaluations of system performance and the following restoration activities. In the last 150 years, the

company has experienced 14 major storm events, including five tropical storms, four category one hurricanes, three category two hurricanes, and two category three hurricanes (see Table 1). The highest sustained hurricane winds the Tampa Electric service area has experienced over this time is the 115 mph winds produced by the category 3 storms in 1949 and again in 1960.

Year	Storm Name	Size	Wind Speed (mph)
1852	Not Named	TS	69
1894	Not Named	Cat 1	86
1910	Not Named	Cat 1	80
1921	Not Named	Cat 2	97
1925	Not Named	TS	69
1933	Not Named	TS	63
1945	Not Named	Cat 2	97
1946	Not Named	TS	46
1949	Not Named	Cat 3	115
1960	Donna	Cat 3	115
1995	Erin	TS	57
2004	Charley	Cat 2	86
2004	Francis	Cat 1	63
2004	Jeanne	Cat 1	63

Table 1. Storms affecting Tampa Electric Service area since 1850 (From the National Hurricane Center Database)

6.1.1.1 2004 Hurricane Season

As demonstrated by the graphic in Fig. 4, Tampa Electric was clearly in an unenviable geographic location during the 2004 hurricane season, directly in the path of hurricanes Charley, Frances and Jeanne. Hurricane Ivan, while it did not pass over Tampa Electric's area, posed significant challenges for the company's fuels management operations, with major natural gas supplies effectively shut down on the Gulf of Mexico. This unprecedented hurricane season was the most devastating in Tampa Electric's 105-year history, both in terms of structural damage to the company's system and in terms of customer outages. Records were made and broken, day after day, as three successive hurricanes ravaged the company's 2,000 square-mile service territory.

Fig. 4 – 2004 hurricanes impacting Tampa Electric's service territory

It started August 13, 2004 as the company's Polk County service area endured a substantial lashing from Hurricane Charley. Tampa Electric had been spared many direct hits from storms of this severity and for most involved in restoration, it was the first time the incident command system had been fully implemented. Operationally, the prognosis for Hurricane Charley was even more complicated – unusual amounts of rainfall earlier in the season had weakened the ground and made it unstable, inviting increased damage. Ultimately, the peak outages numbered 78,000 and the company restored its customers within five days. Hurricane Frances, which struck Tampa Electric on September 5, 2004, posed a different and more significant threat, as it passed over the more populous areas within Tampa Electric's service territory. Making matters worse, the storm lingered, staying over the company's territory for 39 hours. The outage toll was much higher than that of Charley – 268,000 peak outages and the company restored all 268,000 customers within seven days. Hurricane Frances' impact was approximately 95 percent tree- or limb-related. The most impact of any storm, however, came from the third and most unexpected storm of the season – Hurricane Jeanne. Jeanne made a late turn, changing its path substantially in the last hours before landfall. The late turn put Tampa Electric's entire service territory within the storm's reach. Jeanne caused the most extensive structural damage to Tampa Electric's system, with 64 transmission structures down, compared with 31

during Hurricane Charley and 14 during Hurricane Frances. The company was faced with restoring 55 percent of its transmission system. Further complicating Hurricane Jeanne was the initial unavailability of foreign linemen and tree trimmers, who were tapped out working on continued restoration from the previous storms in Florida and throughout the Southeast. Overall, Hurricane Jeanne presented the most outages experienced at a single time in Tampa Electric's history. Thanks to the early and determined response of Tampa Electric's workers and the additional assistance the company received mid-restoration, the 285,000 customers were all restored within seven days.

As a result of these three hurricanes; a total of 2,721 distribution poles were replaced or an average of 0.3% per storm and a total of 110 transmission poles were replaced or an average of 0.14% per storm.

6.1.2 Distribution

This section of the plan builds upon the design philosophy discussed above and provides an overview of the design criteria, construction standards and practices applicable to all new distribution facilities. This section also presents a broad discussion of distribution materials and structure types utilized.

Tampa Electric has developed and maintains a *DETM* which provides corporate and field personnel the policies, procedures and technical data related to the design of distribution facilities owned and operated by the company. Information contained in this manual along with the *SESR*, *GR&S*, *GR&S-UG* and *AMC*, provide guidelines for designing, constructing and maintaining Tampa Electric's distribution system.

6.1.2.1 Overhead System

Voltage

Tampa Electric's standard distribution feeder system operates at 13.2 kV three-phase primary voltage. The company does have three circuits operating at 4 kV primary voltage.

Clearances

Primary voltage conductors are located in the power space on the pole which is the upper most portion of the pole as defined by the NESC. Secondary and service conductors along with the neutral are located approximately six feet lower than the primary conductors. Joint attachers are located in the communication space on the pole which is approximately 40 inches below the neutral cable or Tampa Electric communication cable. Additional facilities may also exist on the same pole (i.e., in the form of a second distribution circuit) in which case the company adheres to all NESC clearance and loading requirements. For typical clearances applicable to joint use attachments, see Attachment A.

Pole Loading

Tampa Electric utilizes NESC Grade B loading criteria as the basis for its construction standard for all new construction, major planned work, expansions, rebuilds and relocations on the overhead distribution system. As described in Section 6.1 above, the safety factors considered in the NESC Grade B criteria provide for a system that is twice as strong as the NESC Grade C criteria which results in a robust design that the company's experience has shown to provide safe, reliable and cost effective service. This standard exceeds the minimum requirement of the NESC, which requires distribution poles to be designed based on a minimum of 60 mph wind speeds. Tampa Electric requires that all distribution facilities be designed to the highest applicable NESC requirement, which is 50 percent stronger than the minimum NESC requirements. While the NESC has requirements related to extreme

wind conditions, these requirements are only for structures over 60 feet in height and rarely apply to distribution structures.

Tampa Electric's experience continues to show that there is no substantial evidence that building distribution structures to extreme wind construction grades will prevent damage from falling trees, tree limbs and flying debris during major storm events. Tampa Electric has concluded from its storm restoration experience and historical hurricane exposure that Grade B construction, which will withstand an effective wind speed between 116 mph (new construction) and 95 mph (at replacement), is the most cost effective and reliable standard for the company's service area.

Materials

There are several types of poles that are used for distribution structures. Tampa Electric's distribution system consists of wood, concrete, steel and fiberglass poles. The standard for all new construction is wood poles that are treated with CCA or Penta poles for rear lot maintenance pole replacements.

The company's standard conductor for circuit feeders is 336 kcmil ACSR with a 2/0 AAAC neutral. Conductor sizes utilized for distribution laterals (overhead takeoffs from feeders) may either be #2, 2/0 or 4/0 AAAC with some older existing facilities containing #6 copper conductor.

Construction Types

Proper configuration selection is emphasized for maintenance, safety and economics. The existing line configuration should be maintained on multi-phase line extensions. Distribution facilities shall not be rebuilt or replaced for the sole purpose of appearance, unless paid for by the customer.

Triangular line configuration using fiberglass brackets is the preferred construction standard. It is the most economical to install and is particularly suited to situations involving restrictive rights-of-way, easements and clearances. Because of its narrow

profile, it should be used for locations with numerous trees. Other construction types that may be used include vertical, modified vertical and wood crossarm.

Pole Loading Compliance

A new process was implemented in 2007 that will assure Tampa Electric is in compliance with all NESC loading requirements and company construction standards. Tampa Electric adopted the use of a pole loading software program, "PoleForeman", as part of this implementation. The program utilizes the company's construction standards (templates) to model each pole and assist company field engineering technicians. The technician inputs the appropriate template, conductor, pole size and class, which the program uses to determine all loads on the pole. The program applies them to the structure and calculates the resulting stresses as a percent loaded.

6.1.2.2 Underground Facilities

Standard Design

Tampa Electric's standard underground distribution system consists of normally looped circuits operating at 13.2 kV three-phase or 7.6 kV single-phase primary voltages. The standard cable is 15 kV strand filled jacketed tree retardant cross-linked polyethylene (TRXLPE) insulated aluminum cable with a copper concentric neutral. Tampa Electric's standard is to place all underground distribution cables in a conduit system buried with 24 to 36 inches of ground cover. Since 2004, all primary switchgear has been specified using stainless steel enclosures to reduce the corrosion effects from salt spray and affluent irrigation spray. All padmounted transformers have been specified utilizing stainless steel in the skirt, door and hinges while the tank is made of a mild steel material.

Network Service

Tampa Electric has two types of underground facilities: standard underground facilities used in residential subdivisions and commercial areas described above and

network service. Network service provides a high level of reliability and operating flexibility. The company utilizes two types of network service: an integrated secondary grid network that serves the high-density load area in downtown Tampa, and spot network systems that serve high-density load in the downtown Tampa network area and the Tampa International Airport. The network system provides redundant feeds and thus is designed to maintain service during a first contingency outage. The network system is somewhat waterproof and can be located in vaults, some of which are below grade. However, the customer owned electrical panels are not waterproof and will likely be severely impacted by saltwater intrusion.

Construction Standards in Coastal Areas

Part of Tampa Electric's service area is bounded by Tampa Bay and has approximately 60 square miles of land in the Flood Zone 1 designated area as defined in Hillsborough County's Hazard Flood Maps. Along these coastal areas, there is increased risk of storm surge, flooding and saltwater contamination. While a good portion of this land is wetlands and is not build-able, the company has instituted higher design and construction standards in this area. The company's proposed standard is that all new underground distribution facilities (padmounted transformer, switchgear, load break cabinets and padmounted capacitors), located in the Flood Zone 1 designated area, shall be of stainless steel or aluminum construction and bolted to the concrete pad. Upgrading the material from mild steel to stainless steel or aluminum is more durable and typically extends equipment life after saltwater contamination; however, the equipment is not waterproof and will require cleaning following a flooding event prior to re-energizing. Any maintenance replacements in this designated area shall also be replaced with a stainless steel or aluminum equivalent.

Procedures Following Flooding Events

The company has considered two scenarios that could occur in these flood prone areas. The first scenario, and the most catastrophic event, would be a Category 3 hurricane or greater with a storm surge of 12 feet or greater producing high crushing water, sand and debris. In this event, the company anticipates everything in the storm

surges path would be moved or buried, as was the case in the aftermath of Hurricane Ivan in Gulf Power's utility system. The result was no load to serve for an extended time after the storm surge. In light of this experience, Tampa Electric has concluded that it is not practical or cost effective to attempt the design of an underground system to withstand such an event.

The second scenario is a flooding event where the water rises up to five feet during a Category 1 hurricane. In this event, there is simply the high water without the accompanying storm surge. In most cases and depending on the level of water, there may not be any load to serve immediately; however, the buildings, houses, etc., will still be standing and may or may not be habitable.

Tampa Electric recognizes there is a significant chance that some equipment may become submerged or flooded during a storm. Although specific locations and severity of flooding cannot be pre-determined, Tampa Electric may choose to de-energize portions of its system if it is in the public's best interest and can be done safely. Tampa Electric will also de-energize portions of its system if directed by the appropriate governing authorities. Prior to re-energizing flooded switchgear and padmounted transformers, the underground equipment will be visually inspected and cleaned with fresh water if saltwater intrusion has occurred. The switchgear fuses will be replaced if the flood levels exceeded the height of the fused barrels. All meters that have been submerged will be replaced prior to re-energizing. If a replacement is not immediately available, the customer's meter may be bypassed. The service can be re-energized after the customer requests it and only after the water has receded and the meter socket and main disconnect have been visually inspected. Tampa Electric's inspection jurisdiction is limited to the meter, meter socket and main disconnect.

Major storms can cause damage to customer owned equipment as well, such as pipe mast, switchgear, or meter socket, and to the degree that service is discontinued. In this case, Tampa Electric will notify the affected customer that service cannot be restored until the customer secures the services of an electrical contractor to make the appropriate repairs.

6.1.2.3 Location of Facilities

Tampa Electric's policy is to place all new distribution facilities in public right-of-way ("ROW"), which is typically in the front of the customer premises, and not to build in rear lot easements. The company clearly recognizes that limited access to facilities located behind the customer's premises significantly increases restoration time. This frontal approach facilitates efficient access during installation and maintenance of the facilities. Prior to 1970 and this policy, distribution facilities were constructed in rear lot easements. From time to time, communities or homeowner associations make inquiries regarding the relocation of overhead facilities from rear lot locations to the front of customers' properties. Tampa Electric evaluates each inquiry on a case-by-case basis for feasibility, practicality and cost effectiveness. Consideration is given to the impact of any tree trimming required along the front of the property (aesthetics), conversion costs, joint attacher cost impacts and scheduling, ROW availability, customer's service main locations and the availability of front access to the dwelling or building.

Should a major storm impact Tampa Electric's service area, the company will evaluate opportunities that may present themselves to relocate rear lot facilities to the front of property as a better alternative than attempting to replace downed facilities in the original rear lot easement. In this situation, customer and third party attacher (if present) consensus must be quickly collected so as not to delay restoration.

6.1.2.4 Critical Infrastructure

Tampa Electric has identified its critical infrastructure as those circuits feeding loads which are critical to the maintenance of basic services that include: public health (water and sewage, fire, hospitals), distilled fuels (refinery, tank farm) and transport hubs (airports). These circuits have the highest restoration priority level. Examples of these types of customers in Tampa Electric's service territory include the Tampa

International Airport, hospitals, Port of Tampa, County and City Emergency Operations Centers, key police and fire stations, and major water and sewage pumping facilities. Over the next three years, Tampa Electric plans to harden three circuits which feed some of the most critical customers on the company's system to extreme wind criteria. These projects will be part of a pilot program, set up to evaluate the benefits of utilizing the NESC extreme wind loading requirements on the distribution system, and are described in more detail in the Deployment Strategy section of the plan.

6.1.2.5 Overhead to Underground Conversions

Tampa Electric will evaluate community, governmental agency and homeowner association requests to convert existing overhead power lines to underground. Each inquiry will be evaluated on a case by case basis for feasibility, practicality and cost impact. Consideration will be given to conversion costs, ROW availability for underground facilities, physical constraints, additional customer cost associated with service main conversion from overhead to underground, joint attacher impact cost, scheduling and coordination.

Tampa Electric developed Table 2 to illustrate the benefits and drawbacks associated with both overhead and underground electric service.

Overhead		Underground	
Benefits	**Drawbacks**	**Benefits**	**Drawbacks**
Lower cost to install and maintain	Overhead lines tend to have more power outages primarily due to trees coming in contact	Better aesthetics	Difficult and longer to trouble shoot outages
Easier to restore and locate faults	Higher exposure due to wind impact	Less exposure to high winds and reduced outages due to animals	More costly to restore/repair outages (four times)[1]
Shorter duration of power outages	Accidental contacts from antennas and aluminum gutter installations	No tree trimming expense	More exposure due to storm surge or flooding
Overhead facilities have more operational flexibility, e.g.,	High exposure in traffic areas, roadways, easements	Property values tend to be higher	More costly to install and maintain. Up to ten times the cost of new overhead power line[2] and

Overhead		Underground	
Benefits	Drawbacks	Benefits	Drawbacks
adding transformer, tapping lateral			higher cost upgrading existing underground facilities due to expansion
Higher life expectancy	Poor aesthetics	Reduce risk of electrocutions due to antennas and aluminum gutter installations	40 year old overhead lines have better reliability than 20 year old underground lines[1]

Table 2. Summary of benefits and drawbacks of overhead and underground electric service

1. From the North Carolina Utilities Commission, November 2003, Feasibility of Placing Electric Distribution Facilities Underground
2. From the Edison Electric Institute, 2004, ***Out of Sight, Out of Mind, A study on the costs and benefits of undergrounding overhead lines.***

6.1.3 Transmission

This section of the plan provides an overview of design considerations and references when performing a transmission structure analysis for new and existing facilities. This section is a broad discussion of transmission structure types, foundation design and design criteria.

6.1.3.1 Transmission Structures

Voltage levels

Tampa Electric's transmission system consists of circuits operating at 230 kV, 138 kV and 69 kV voltages. These circuits constitute a minimum of three-phase conductors and a static wire (ground). Additional facilities may exist or be incorporated in the design of a transmission structure. These include additional transmission circuits, optical ground wire, distribution circuits and a conglomeration of wire attachments by joint attachers.

Material types

There are several types of materials that are utilized for transmission structures. Tampa Electric's transmission system consists of wood, concrete, aluminum and steel support structures. Past practices utilized wood pole, aluminum and lattice steel structure design. Pre-stressed spun concrete and tubular steel technology is now the preferred method. Since 1991, Tampa Electric has adopted a standard that all new

construction, line relocations and maintenance replacements will require a pre-stressed spun concrete or steel pole replacement.

Configuration Types

There are multiple transmission structure configurations utilized. Prior to pre-stressed spun concrete and tubular steel technology, typical structure configurations commonly consisted of single wood structures, multi wood structures, wood H-frames, lattice aluminum H-frames and lattice steel towers. The advent of pre-stressed spun concrete and tubular steel poles has permitted a more cost effective, low maintenance and high strength option. The pre-stressed spun concrete poles and tubular steel poles are utilized in multiple configurations. Typical configurations utilizing these poles are single pole, multi pole and H-frame structures.

The configurations will vary widely when considering the many variables attributed to transmission facilities. Some of these variables are: number of circuits, conductor size, span length, soil conditions, ROW width, potential permitting requirements, utilization of adjacent land, environmental impacts, electric and magnetic field criteria, aesthetics, economics and community input. Single pre-stressed spun concrete or tubular steel structure configurations have proven to be the most economical and maintainable choice given the work environment and constraints encountered while engineering and constructing transmission facilities.

6.1.3.2 Foundations

Drilled shaft and direct embedment are the two preferred foundation types utilized for pre-stressed spun concrete or tubular steel structures. A drilled shaft typically has a specified depth, diameter, steel rebar cage, poured concrete and bolted flange plate for the pole base. A direct embedded foundation typically has a specified depth and diameter. The direct embedded foundation also requires that a segment of the superstructure to be embedded below ground, acting as part of the foundation, with natural backfill, crushed rock backfill or poured concrete backfill.

Tampa Electric uses a modified Broms foundation analysis for overturning foundation design. It is imperative that soil borings are collected or standard penetration tests are conducted to compile the appropriate soil data for foundation analysis. Tampa Electric's service area is regional and ground conditions are considered to be mostly sandy soil; however, soil is non-homogeneous and can very greatly. It is also assumed that the water table is at grade which has a significant impact on soil strength, but remains a good assumption given the environment of Tampa Electric's service area.

6.1.3.3 Design Criteria

There are two types of methodologies used to analyze pole strength. Tampa Electric uses the ultimate strength analysis for all wood and non-wood structures. However, it is acceptable and often recommended to use the working stress method for wood poles.

Tampa Electric designs and specifies all transmission facilities in accordance with the latest version of the NESC. All designs address extreme wind, Grade B construction. The extreme wind loads are applied to all attachments on the transmission structure regardless of attachment height.

Tampa Electric's service area is largely within the 100 mph to 120 mph extreme wind contours referenced in the NESC. The company has concluded that the 120 mph wind standard will be applied on all 69 kV and 138 kV structures throughout Tampa Electric's service area. It has also been determined to continue the past practice of applying a 133 mph wind standard to all 230 kV structures throughout Tampa Electric's service area. The 133 mph wind standard exceeds the NESC requirements for extreme wind loading. This standard was adopted when Tampa Electric commissioned the first 230 kV line in its service area and the company continues to support the 133 mph wind standard as the best practice for 230 kV construction.

Since the inception of the NESC extreme wind standard, it has been applied to all Tampa Electric transmission facilities. However, the company has always applied a 133 mph wind standard to all 230 kV facilities.

6.1.4 Substation

Tampa Electric designs, constructs and maintains transmission and distribution substations and switchyards ranging from 13.2 kV to 230 kV with 217 existing substations. This includes performing siting studies, physical design, grading and drainage, foundation design, layout and design of control buildings, structure design and analysis, protection and control systems, and preparation of complete specifications for material, equipment and construction.

6.1.4.1 Design Philosophy

Wind Strength Requirements

Tampa Electric designs its substations in accordance with the latest approved version of the NESC. Currently, all distribution substation structures are designed to withstand a wind load of 120 mph.

At 230 kV generation facilities and 230 kV transmission stations, current design standards call for terminal line structures to withstand 133 mph wind loading along with the line tension of the transmission circuit.

The design standards summarized above meet the NESC loading criteria for extreme wind, Grade B construction. As previously stated, Tampa Electric's service area is within the 100 to 120 mph extreme wind contours referenced in the NESC.

Protection

Animal protection covers are installed on all 13 kV bushings, lightning arrestors, switches and leads. This helps prevent outages caused by animals and will also reduce damage from debris that may get inside the substation during a major storm event. Tampa Electric uses circuit switchers instead of fuses or ground switches on

new and upgraded transformer installations. This design will clear a fault much quicker, which minimizes damage and greatly reduces restoration time.

Other

Equipment elevations will be carefully evaluated when building on existing sites or when selecting future sites in the Flood Zone 1 designated area. Information on past flooding and potential future storm surge levels will be evaluated. Much equipment is built on steel supports and is above expected flood levels. Some equipment such as transformers can be submerged up to the point of attached cabinets and controls. Therefore the major focus will be on the elevation and water resistance of the control cabinets and related equipment. The sites and/or equipment will be elevated based on the overall site permitting that must be done with the governmental and environmental agencies taking into consideration the surrounding area.

6.1.4.2 Construction Standards

In a typical new distribution substation, the structures are of a galvanized tubular steel design. The tallest structure is approximately 24 feet above grade, with the majority of the structures and equipment being below 17 feet. Distribution feeder circuits are designed to exit the substation via underground cables installed inside six-inch conduit.

Control buildings are installed in 230 kV substations and 69 kV switching stations. These buildings are typically of concrete block construction with poured concrete columns and concrete roof panels, which are designed to withstand winds of 120 mph without any damage to the building or the equipment, housed inside. Recently the company design standard has been increased to 150 mph.

Chain link perimeter fences, depending on height and type of construction, have been designed to withstand 100 to 120 mph winds. Current fences are being designed for 120 mph. Perimeter walls are designed in accordance with the Florida Building Code, 125 mph wind load, Exposure B. Tampa Electric installs eight-foot tall perimeter chain link fences or walls, which exceed the NESC minimum height of

seven feet. This provides additional protection from wind-blown debris. Tampa Electric is also evaluating alternative types of fences that may be more effective in blocking debris.

7 DEPLOYMENT STRATEGY

Tampa Electric's storm hardening plan's deployment strategy will enhance system reliability and reduce storm restoration costs. The deployment strategy includes: 1) the implementation of the construction standards outlined above for all new transmission, distribution and substation facilities, 2) various maintenance programs that will strengthen and upgrade the system to current standards, 3) other storm hardening initiatives as outlined in Tampa Electric's 2006 Storm Implementation Plan filed March 2, 2007 and 4) establishment of a three-year program that will pilot the extreme wind loading standard for select targeted distribution facilities serving critical infrastructure within the company's service territory.

7.1 Construction Standards

The transmission, distribution and substation design and construction standards described in Section 6 are in affect and apply to all new facilities as well as all rebuilds, relocations and maintenance.

A majority of new distribution facilities Tampa Electric constructs each year is placed underground, however the company has averaged 20 miles of new overhead distribution construction over the last few years. The company also has multiple new transmission line construction projects starting within the next three years. There will be approximately 45 miles of 230 kV construction and approximately 36 miles of 69 kV construction occurring by 2010. These transmission projects will add a significant amount of capacity and redundancy to the state transmission grid.

7.2 Maintenance programs

7.2.1 Vegetation Management

Tampa Electric's Transmission and Distribution Vegetation Management Program includes a balanced approach to improve the quality of line clearance while adhering to the American National Standards Institute ("ANSI") A300 pruning standards. The company manages over 6,100 miles of distribution and 1,200 miles of transmission lines over five counties within Florida. The company's vegetation management plan calls for every circuit to be trimmed every three years with a special emphasis on critical trimming based in areas identified by Tampa Electric's reliability base methodology. Established vegetation management program funding levels are estimated at $9.3 million annually for 2007 through 2009.

7.2.2 Distribution Maintenance

7.2.2.1 Pole Replacements

Tampa Electric's Wood Pole Groundline Inspection Program is part of a comprehensive program initiated by the FPSC for Florida investor-owned electric utilities to harden the electric system against severe weather and unauthorized and unnoticed non-electric pole attachments which affect the loadings on poles.

This inspection program complies with Order No. PSC-06-0144-PAA-EI, issued February 27, 2006 in Docket No. 060078-EI which requires each investor-owned electric utility to implement an inspection program of its wooden transmission and distribution poles on an eight-year cycle based on the requirements of the NESC. This program provides a systematic identification of poles that require repair or replacement to meet strength requirements of NESC.

Pole inspection targets by service area are established with a goal of completing approximately 12.5 percent of the entire system each year. The 2007-2009

groundline pole inspections program goals/targets include approximately 38,000 distribution pole inspections at an estimated annual cost of $1.5 million.

Tampa Electric will conduct a pole loading analysis and data collection on poles having third party attachments. The analysis will ensure that the condition of the pole meets the requirements in Table 261-1A of the NESC and Tampa Electric Construction Standards.

Tampa Electric sets an aggressive goal to complete all the required replacements prior to hurricane season the year following the inspection. Tampa Electric's Groundline Inspections Program strategy takes a balanced approach and has produced excellent results in a cost effective manner. The future inspections coupled with its pole replacement program will ultimately harden Tampa Electric's transmission and distribution poles.

In 2007, Tampa Electric will replace an estimated 1,420 distribution poles at a total cost of $3.3 million. The 2007 goals were developed using historical failure rates scaled to the increased inspection cycles.

7.2.3 Transmission Maintenance

The Tampa Electric transmission system inspection program identifies potential system issues along the entire transmission circuit by analyzing the structural conditions at the groundline and above ground as well as the conductor spans. The inspection program is a multi-pronged approach with inspection cycles of one, six or eight years depending on the goals or requirements of the individual inspection activity. Formal inspection activities included in the program are groundline inspection, ground patrol, aerial infrared patrol, above ground inspection and substation inspections. The ground patrol, aerial infrared patrol and substation inspections are performed on one-year cycles, the above ground inspection is performed on a six-year cycle and the groundline inspection is performed on an eight-

year cycle. Additionally, pre-climb inspections are performed prior to commencing work on any structure.

7.2.3.1 Groundline Inspection

Tampa Electric has implemented a groundline inspection program that complies with the Commission's order requiring groundline inspection of wooden transmission structures. In addition, Tampa Electric has included provisions in the groundline inspection program to identify deficiencies with non-wood structures. Groundline inspections are performed on an eight-year cycle. Each year approximately 12.5 percent of all transmission structures are scheduled for inspection. These inspections will also include a wind load analysis that will be performed on the structures where third party attachments are present. In 2007, groundline inspections are planned on 3,412 transmission structures. This represents approximately 12.5 percent of the company's transmission structures. The 2007 estimated cost for this activity is $135,000 and it is anticipated that the annual number of inspections and budget for 2008 and 2009 will be similar.

7.2.3.2 Ground Patrol

The ground patrol is a visual inspection for deficiencies including poles, insulators, switches, conductors, static wire and grounding provisions, crossarms, guying, hardware and encroachment. The ground patrol will include identification of vegetation encroachment as well as all circuit deficiencies. All transmission circuits are patrolled by ground at least once prior to the beginning of storm season each year. The budget for the ground patrol is estimated to be $46,000 annually.

7.2.3.3 Aerial Infrared Patrol

The aerial infrared patrol is performed annually on the entire transmission system. It is performed by helicopter with a contractor specializing in thermographic power line inspections and a company employee serving as navigator and observer. This inspection identifies areas of concern that are not readily identifiable by normal visual methods as well as splices and other connections that are heating abnormally and may result in premature failure of the component. This inspection also identifies obvious system deficiencies such as broken crossarms and visibly damaged poles. Since many of these structures are on limited access ROW, this aerial inspection provides a frequent review of the entire transmission system and helps identify potential reliability issues in a timely manner. The infrared patrol is planned for 100 percent of the transmission circuits with an annual budget of $53,000.

7.2.3.4 Above Ground Inspection

Above ground inspections are performed on transmission structures on a six-year cycle; therefore, each year approximately 17 percent or one-sixth of transmission structures are inspected. This inspection is typically performed by a contractor specializing in above ground power pole inspection and may be performed by climbers, bucket truck or helicopter. The above ground inspection is a comprehensive inspection that includes assessment of poles, insulators, switches, conductors, static wire, grounding provisions, crossarms, guying, hardware and encroachment issues. This program provides a detailed review of the above ground condition of the pole and the associated hardware on the structure. Above ground inspections are planned annually for approximately 17 percent of the company's transmission structures or, 3,784 structures comprising 22 circuits. The annual spending for this activity is estimated at $200,000.

7.2.3.5 Pre-Climb Inspections

While not a part of the formal inspection program outlined above, Tampa Electric crews are required to inspect poles prior to climbing. As part of these inspections, the employee is required to visually inspect each pole prior to climbing and sound each pole with a hammer if deemed necessary. These pre-climbing inspections serve to provide an additional integrity check of poles prior to the employee ascending the pole and may also result in the identification of any structural deterioration issues.

7.2.3.6 Reporting

Standardized reports are provided for each of the formal inspections. Deficiencies identified during the inspections are entered into a database. This maintenance database is used to prioritize and manage required remediation. Deficiencies identified during the pre-climb inspections are assessed by the on-site crew and reported to supervisory personnel for determination of next steps.

7.2.3.7 Pole Replacements

Tampa Electric is hardening the existing transmission system in a prudent, cost effective manner utilizing its inspection and maintenance program to systematically replace wood structures with non-wood structures. The company has approximately 26,000 transmission poles in service today with wood poles accounting for approximately 17,000 of the total. In 2007, it is estimated that Tampa Electric will harden 623 transmission structures with a budget of $6.9 million. This includes 421 structure replacements with steel or concrete poles and 202 sets of insulators replaced with polymer insulators. The 2007 hardening goals were developed using historical failure rates scaled to the increased inspection cycles. It is anticipated that 2008 and 2009 will have a similar amounts of replacements and expenditures.

In addition to the pole replacements discussed above, Tampa Electric is aware of approximately 40 transmission line relocation projects within the next three years.

These projects are a combination of road construction and new development. The timing of these projects is primarily based on the governmental agencies' and the developer's schedule. It is estimated that approximately 250 wood poles will be replaced with 250 non-wood poles during the next three years due to these projects at an annual cost of approximately $1 million.

Community outreach has already begun for most of these projects and will continue until construction is complete. Tampa Electric's community outreach program involves informational mailings to all customers in the vicinity of the project, multiple community meetings, communication to governing agencies, project information on the internet and notifications in local newspapers.

7.2.4 Substation Maintenance

Flood zones are carefully evaluated when building on existing sites or when selecting future sites. Over the next three years, the company will review existing sites in the Flood Zone 1 designated area. The major focus will be on the elevation and water resistance of control cabinets and related equipment. Prudent modifications will be made. Consideration will be given to whether there will be load to be served in the area of the substation immediately after a storm and if any load can be picked up from adjacent substations that are outside the flooded area.

When transformers are added to an existing substation or a transformer is upgraded, existing fences are removed and new fences are installed to current NESC wind and height standards. At the same time, animal protection covers are installed on all 13 kV bushings, lightning arrestors, switches and leads. This will help prevent damage from debris that does get inside the substation. This type of work will be done in about five substations per year based on current expansion plans. These improvements cost an average of $75,000 per substation and the total estimated cost for 2007 through 2009 is $1.1 million.

Tampa Electric also plans to convert from fuses or ground switch protection to circuit switchers at four locations per year over the next three years based on current

expansion plans. These improvements cost an average of $100,000 per location and the total estimated cost for 2007 through 2009 is $1.2 million.

7.3 Other Storm Hardening Initiatives

7.3.1 Downtown Network

The Tampa downtown network is a small area of dense loads made up mostly of high-rise office buildings. This area is considered critical infrastructure because of the high concentration of business and governmental buildings in this area. The types of businesses include telecommunications switching center, banking, city and county governmental offices, federal and county courthouses as well are approximately 2500 hotel rooms and 6.5 million square foot of office space. The Marion Street substation serves the downtown network with six underground distribution circuits. The boundaries shown in Fig. 5 are as follows: Interstate 275 on the north, Morgan Street to Cass Street to Jefferson Street to Zack Street to Governor Street to Whiting Street on the east; Whiting Street on the south and the Hillsborough River on the west.

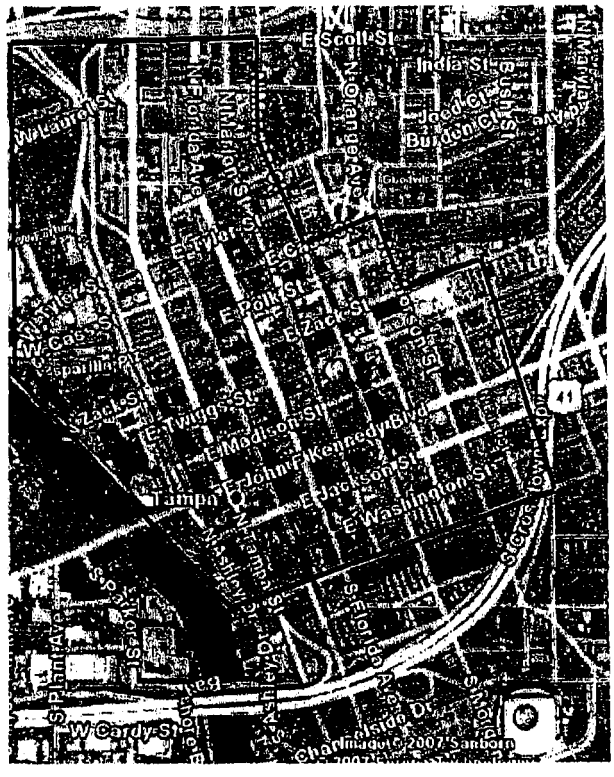


Fig. 5 - Downtown Network Boundaries

The downtown network consists of 361 manholes and 56 network vaults. Most contain two network transformers and two network protectors. The typical elevation in the downtown area is twelve feet or greater, however, there are a few areas with lower elevation. These areas are west of Ashley Street and south of the Crosstown Expressway. In these areas, there are eight below grade vaults and two additional vaults that have historical flooding tendencies. Although network protectors are thought to be waterproof, Tampa Electric has put into its storm hardening plans the pressure testing of the 18 network protectors located in the 10 low lying manholes and vaults. If the results of the tests show any signs of leakage, all the pertinent gaskets will be replaced. The total three-year costs for this project are estimated to be $60,000.

7.3.2 Tampa International Airport

Tampa International Airport is served by six distribution circuits which are all underground and emanate from one substation. Tampa Electric's plan is to upgrade a transmission segment feeding the Skyway substation to today's extreme wind construction standards. The project consists of replacing 62 existing wood transmission poles with steel or concrete poles. While Skyway substation has multiple transmission feeds, this project will ensure that one of them is upgraded to non-wood structures that meet today's construction standards. The project will be completed in 2009 at an estimated cost of $618,000.

7.3.3 Conversion of remaining 4 kV distribution circuits

Tampa Electric is proposing to convert the remaining three 4 kV distribution circuits as part of its hardening plans. The benefits are in the form of standardizing the distribution voltage to only 13.2 kV. This will eliminate the confusion of dual distribution voltages and the need to have different construction standards and critical spare material, which will result in faster restoration. The plan is to complete the engineering in 2007 and construction in 2008 at an estimated cost of $582,000.

7.3.4 Overhead to Underground Conversion of Interstate Highway Crossings

This activity focuses on hardening limited access highway crossings which will prevent the hindrance of first responders, emergency vehicles and others due to fallen distribution lines blocking traffic. The restoration of downed overhead power lines over interstate highways can be lengthy because of heavy traffic congestion. Tampa Electric's current preferred construction standard requires all distribution line interstate crossings to be underground. Therefore, the company's hardening plan calls for converting several overhead distribution line crossings on interstates I-75, I-4

and the East-West section of I-275 to underground. The three year plan is to underground 12 distribution line crossings at a total estimated cost of $600,000 or four crossings at an annual cost of $200,000.

7.3.5 Post-Storm Data Collection and Forensic Analysis

As outlined in Tampa Electric's 2006 Storm Implementation Plan filed March 2, 2007, Tampa Electric plans to implement a formal process to randomly sample system damage following a major weather event in a statistically significant manner. This information will be used to perform forensic analysis in an attempt to categorize the root cause of equipment failure. From these reports, recommendations and possible changes will be made regarding engineering, equipment and construction standards and specifications. Data Collection Operations personnel will patrol a representative sample of the damaged areas of the electric system following a major storm event and perform the data collection process. At a minimum, the following types of information will be collected:

- Pole/Structure - type of damage, size and type of pole, and likely cause of damage.
- Conductor - type of damage, conductor type and size, and likely cause of damage.
- Equipment - type of damage, overhead or underground, size, and likely cause of damage.
- Hardware - type of damage, size and likely cause of damage.

Engineering personnel will perform the forensic analysis of a representative sample of the data obtained to evaluate the root cause of failure and assess future preventive measures where possible and practical. This will include evaluating the type of material used, the type of construction and the environment where the damage

occurred including existing vegetation and elevations. Changes will be recommended and implemented, if more effective solutions are identified by the analysis team.

7.4 Extreme Wind Pilot Program

Tampa Electric's three-year strategy for piloting the extreme wind loading criteria on distribution facilities focuses on targeting two critical customers. These include a local hospital and the Port of Tampa gasoline tank storage area. The circuits feeding the hospital and the Port of Tampa will be rebuilt to meet extreme wind loading and their performance will closely be monitored during and after hurricane events and compared to the performance of other circuits in the same area built to the current standard.

7.4.1 Port of Tampa

The Port of Tampa is a critical facility as it serves 10 petroleum distribution customers that deliver 40 percent of the gasoline in the state of Florida. Six miles of distribution feeder will be rebuilt to meet the extreme wind requirements as shown in Fig. 6.

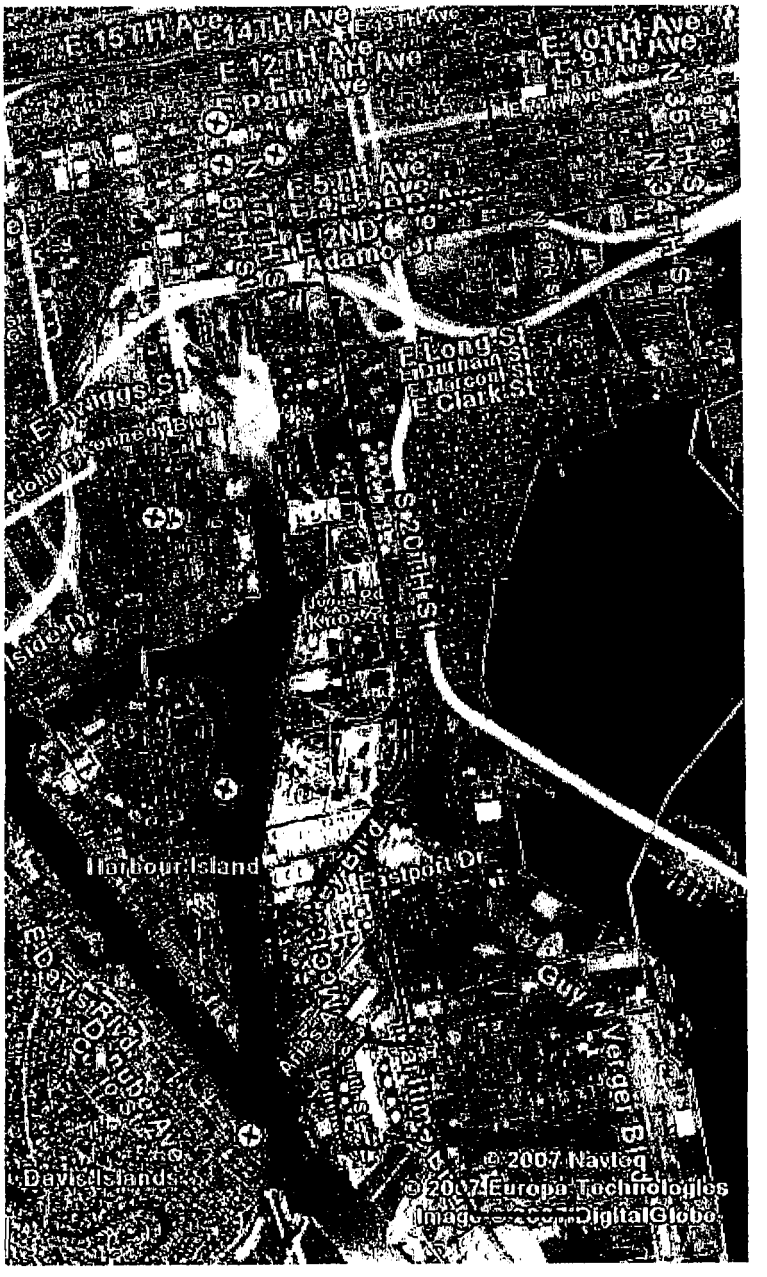


Fig. 6 – Aerial photograph of Port of Tampa with outlined distribution route

The three-year deployment strategy for this extreme wind upgrade project is as follows:

2007 – Rebuild a three-mile feeder to the north of the Maritime substation. This will include upgrading approximately 111 distribution poles and replacing 38 wood transmission poles with non-wood poles at an estimated cost of $760,000.

2008 - Rebuild the one-mile feeder to the south of the Maritime substation. This will include upgrading approximately 37 distribution poles estimated cost $120,000.

2009 – Rebuild a two-mile feeder from an alternative substation to pick up three miles of a previously rebuilt (from 2007 and 2008) feeder should a flooding event at the Maritime substation site occur. This will include upgrading approximately 74 distribution poles at an estimated cost of $240,000. As a side benefit, the Hillsborough County Sheriffs Operation Center will also be served from the hardened feeder.

7.4.2 Saint Joseph's Hospital

While there are several hospitals in Tampa Electric's service territory that are considered critical customers, Saint Joseph's Hospital was chosen for this pilot program because of its Level 2 Trauma Center status, central location, high elevation and the cost effectiveness of the hardening activities. The distribution feeder serving the hospital is approximately one-mile in length and will be rebuilt to meet the extreme wind requirements. The hardening measures to be employed include replacing 37 distribution poles and with a stronger class wood poles estimated cost of $120,000 and six wood transmission poles with non-wood pole at an estimated cost of $70,000. This project location is shown in Fig. 7 and is planned for 2008.

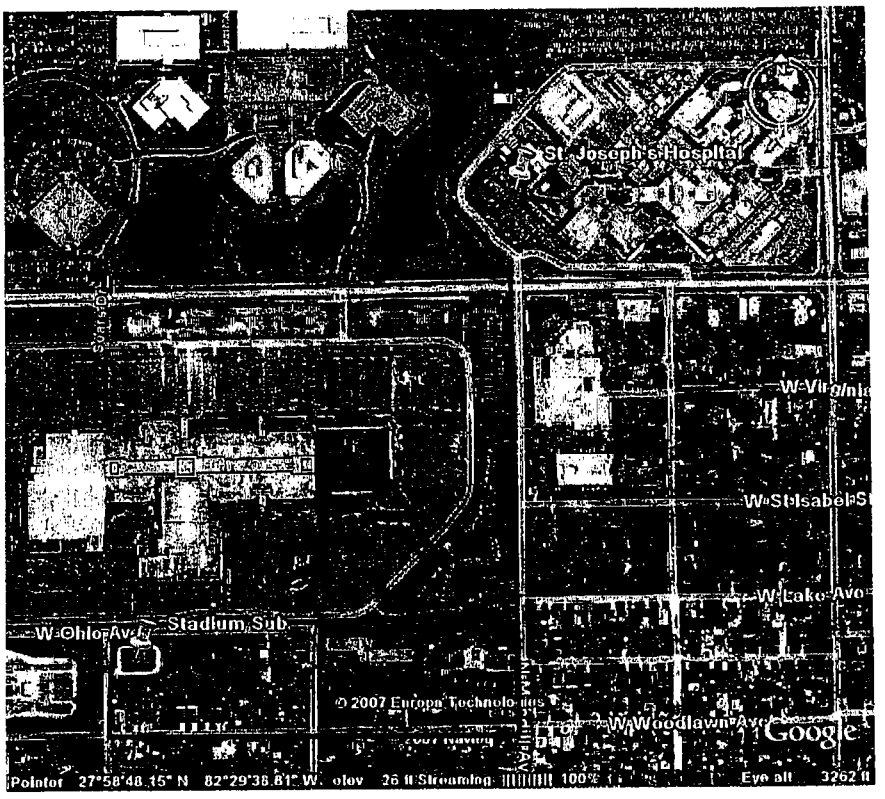


Fig. 7 – Aerial photograph of Saint Joseph's Hospital with outlined distribution route

7.5 2007-2009 Deployment and Costs

The storm hardening projects planned by Tampa Electric through 2009 with their estimated costs are summarized below in Table 3.

Project	2007	2008	2009
Port of Tampa	$760,000	$120,000	$240,000
Saint Joseph's Hospital	0	190,000	0
Tampa International Airport	0	0	618,000
Downtown Tampa Network	20,000	20,000	20,000
Conversion of 4 kV Circuits	42,000	480,000	0
Hardening of Interstate Crossings	200,000	200,000	200,000
Transmission pole inspections	135,000	147,000	152,000
Transmission above ground inspections	182,000	211,000	217,000
Transmission pole replacements	6,854,000	7,010,000	7,220,000
Distribution pole inspections	1,627,000	2,074,000	2,136,000
Distribution pole replacements	3,300,000	5,750,000	6,040,000
Pole reinforcements	1,004,000	894,000	920,000
Substation enhancements	775,000	775,000	775,000
Vegetation management	9,300,000	9,600,000	9,900,000
Total	**$24,199,000**	**$27,471,000**	**$28,438,000**

Table 3. Estimated 2007-2009 Storm Hardening Costs

7.5.1 Third Party Attacher Benefits and Impacts

Tampa Electric's 2007 – 2009 Storm Hardening Plan is expected to provide benefit to all third party attachers and have minimal impact on third parties attached to our system. The facilities that are planned to be rebuilt to extreme wind loading criteria will utilize the same route and require that the attachers merely transfer from the old

poles to the new poles. The largest impacts will come from the increased pole inspections, which now include a pole loading analysis and the annual pole attachment audit that Tampa Electric will perform.

Pole loading calculations will be conducted as part of the pole inspection program on any joint use pole to ensure that each pole is not overloaded or approaching overloading. Any pole that fails a preliminary stress test will be flagged and a comprehensive pole loading analysis will be conducted to determine if the pole is overloaded and, if it is, which attachment is actually causing the overload. If the responsible party is a joint use attaching entity that has not permitted with Tampa Electric to be on that pole, Tampa Electric will notify the joint use entity which will have the choice of removing their attachment(s) or paying for the cost of any needed corrective action. Comprehensive loading analysis results will indicate the percent of utilization by each attaching entity. If it is determined that a Tampa Electric attachment caused the pole to be overloaded, the pole will be replaced and the attaching entities will be notified of the need to transfer their attachments to the new pole. If it is determined that an attaching entity overloaded the pole, Tampa Electric will work with attaching entities to determine when an attachment was placed and whether the attachment was approved by Tampa Electric prior to being placed on the pole. Once it is determined which entity overloaded the pole, that entity will be responsible for any corrective measures required to mitigate the overload. Each situation will be evaluated on a case by case basis with consideration given to the circumstances of the particular pole being evaluated.

Tampa Electric will also conduct an audit of all pole attachments on an eight-year cycle at a minimum. The purpose of this attachment audit is to identify the location of each pole; the facilities attached and to obtain verification that such attachments are pursuant to a current joint use agreement. Costs of this audit will be shared by all attaching entities. Following the audit, if any unauthorized attachments are found, Tampa Electric will true-up its pole attachment count and back bill to the last audit unless attacher can provide documentation of an approved permit authorizing the attachment. Unauthorized attachment fees may also be assessed for any attachments

not previously approved. Additionally, the attacher will be responsible to pay for a complete engineering study and for any corrective action required to meet NESC and/or Tampa Electric construction standard requirements.

8 ATTACHMENT STANDARDS AND PROCEDURES

Tampa Electric has approximately 330,000 third party attachments on its transmission and distribution poles throughout its service territory. This includes attachments made by telecommunications companies, cable TV companies and governmental entities. This section of the plan outlines the standards, procedures and policies that must be adhered to by all third party attaching entities.

8.1 Access to Tampa Electric poles

Access to Tampa Electric poles is granted only to those companies who have an attachment agreement with the company. Licensee must also secure any necessary permit, consent, or certification from state, county or municipal authorities or private property owners prior to attaching. If an attaching entity does not currently have an agreement with Tampa Electric, it is necessary to contact the Pole Attachment and Contract Administration Department at the company (see Attachment B).

8.2 Permit Application Procedure

Prior to permit application submittal; the licensee should take the time to review it's attachment agreement with Tampa Electric, including the Tampa Electric construction standards as outlined in Section 6.

Prior to attaching, a completed permit application (see Attachment C) shall be submitted to Tampa Electric for all new attachment requests or overlashing to

existing attachments requests on Tampa Electric owned distribution and transmission poles.

No access will be granted for attachment to any poles that are specifically used for private and street lighting systems only. Access to transmission poles is not mandated by the Telecommunications Act of 1996 and is typically not granted due to excessive make ready construction costs. It is recommended that the licensee should avoid permitting to attach to transmission poles whenever possible. A complete engineering study for transmission facilities may take much longer than the 45 days it takes for distribution pole access.

8.2.1 Permit Application Documentation

Licensee's completed permit application shall also include the documentation listed below. Additionally, a deposit may be required for the engineering study and any make ready construction activities. Omission of any required documentation may result in the rejection of licensee's permit application delaying the permit approval.

- Attachment C must be completed in its entirety
- Legible map showing entire route highlighted, along with identification to correlate poles on map to poles identified in Attachment C
- Overall county or city site map highlighted and identifying the proposed construction area
- Required documents must be submitted in duplicate
- Deposit fee in the amount of $200.00 per pole (This may be based on credit worthiness and/or contract terms and conditions.)

8.2.2 Permit Engineering Study Review

Once Tampa Electric has received and accepted licensee's completed permit application, the company will review the proposed pole attachments and conduct a complete engineering study to ensure compliance of the NESC and Tampa Electric's construction standards. This study will include a structural loading and a clearance analysis on each pole. This study may take up to 45 days to complete for distribution poles and typically longer for transmission poles. Therefore, permit applications should be submitted a minimum of 90 days in advance of the expected installation date and an additional 45 days for make ready construction involving transmission. For joint use parties (e.g., Verizon, Embarq), Tampa Electric will determine whether joint use is excluded on any pole application within 10 days.

8.3 Make Ready

8.3.1 Make Ready Construction Not Required

If the results of the engineering study find no existing or proposed violations with the NESC and Tampa Electric construction standards, the company will return a signed copy of licensee's permit request (see Attachment C) approving the installation of the proposed attachments. The licensee has 120 days from the approved permit date to complete attachment construction.

8.3.2 Make Ready Construction Required by Tampa Electric

If it is determined that make ready construction by Tampa Electric is necessary to accommodate the proposed attachments, the company will notify licensee in writing of the required work along with an estimate of the construction costs. Upon licensee's acceptance of the estimate and submittal of any additional payments over and beyond the initial deposit, Tampa Electric will schedule and complete the required make ready work. Upon completion of the make ready construction, Tampa Electric will

return a signed copy of licensee's permit request (see Attachment C) approving the installation of the proposed attachments. The licensee has 120 days from the approved permit date to complete attachment construction.

8.3.3 Make Ready Construction Required by Existing Third Party Attacher

If it is determined that make ready construction by a third party attacher is necessary (lower or raise attachments) to accommodate the proposed attachments, Tampa Electric will notify licensee via the National Joint Utilities Notification System ("NJUNS") describing the re-arrangement work required. The NJUNS system is internet based and is located at www.njuns.com. This system is used by Tampa Electric to communicate with its pole attachment licensees of the need to perform work. The licensee must contact the responsible third party directly to negotiate work schedules and/or costs. Upon completion of this work, Tampa Electric shall be notified via the completion of the NJUNS ticket which will prompt the company to schedule an inspection to confirm all make ready construction has been completed. Once approved, Tampa Electric will return a signed copy of Licensee's permit request (see Attachment C) approving the installation of the proposed attachments. The licensee has 120 days from the approved permit date to complete attachment construction.

8.4 Tampa Electric Post Inspection Process

Upon completion of licensee's attachment installation, licensee shall forward a completed copy of the Attachment D identifying the poles attached to with either the 10 digit geographic location number ("GLN") which is typically white numbers on a green background secured to the pole, or if no GLN exists, the six digit asset tag number located on a silver tag secured to the pole as well as the date attached and return to Tampa Electric. The company will perform a post inspection of licensee's

construction. If Tampa Electric finds licensee's construction to meet all NESC and Tampa Electric standards, the company will authorize the installation, close the job and reconcile the final costs.

8.4.1 Code Violations

If the company finds any violations of Tampa Electric construction standards, licensee will be notified via NJUNS to make immediate corrections. The licensee will be given 30 days to correct the violations before Tampa Electric will schedule a second post inspection. If licensee fails the second post inspection, Tampa Electric will complete the work for licensee at licensee's expense. Repeated failure to correct any code violations within the 30 day time period may result in suspension of future attachment rights.

8.5 National Joint Utility Notification System

NJUNS (www.njuns.com) is an electronic notification tool used to notify licensee of any code violations found during the post inspection process. The use of this tool is paid for by Tampa Electric and does not cost licensee anything to use. The licensee will be required to communicate with Tampa Electric via this tool regarding all permit applications per its attachment agreement. Prior to submitting any permit application, licensee must have created an NJUNS account. Additionally, as part of its normal construction process, Tampa Electric will use NJUNS to notify licensees of the need to perform cable or equipment transfers when poles are being replaced or are being relocated. The licensee should contact Tampa Electric for assistance if necessary.

8.6 Permit Closeout and Final Billing

Upon completion of licensee's permit application, Tampa Electric will complete the final billing within 60 days of the completion date. Tampa Electric will reconcile the estimated pre-paid costs and the actual incurred costs. Tampa Electric will issue a refund check for any over payments or an invoice for any additional monies owed to the company. The invoice will include the total costs of the engineering conducted to process licensee's permit application and any construction costs due to make ready. If licensee's permit resulted in new attachments to Tampa Electric poles, licensee will also receive an invoice for the advanced pole rental due for the total of the new pole attachments.

8.7 Pole Inspection Program

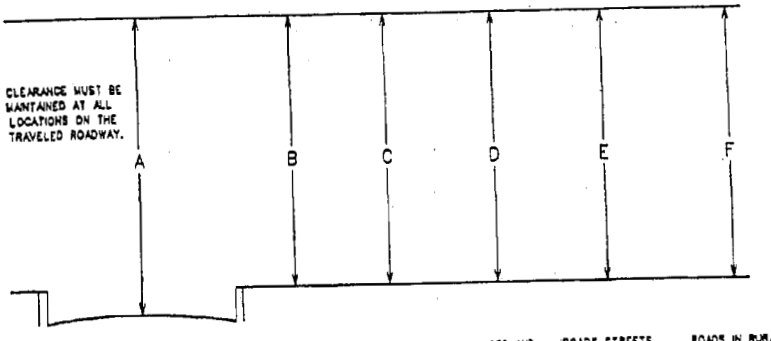
Pursuant to FPSC Order No. PSC-06-0144-PAA-EI (eight-year pole inspection requirement), Tampa Electric will conduct an inspection of all poles on its system on an eight-year cycle for distribution poles and a six-year cycle for transmission poles to evaluate the condition of each pole. Additionally, stress calculations will be conducted on any joint use pole to ensure that each pole is not overloaded or approaching overloading for instances not already addressed by Order No. PSC-06-0144-PAA-EI. Any pole that fails a preliminary stress test will be flagged and a comprehensive pole loading analysis will be conducted to determine two things: 1) confirm if the pole is in fact overloaded and 2) if overloaded, which attachment is actually causing the overload. If the responsible party is a joint use attaching entity that has not permitted with Tampa Electric to be on that pole, Tampa Electric will notify said party. The joint use entity will have the choice to remove their attachment(s) or pay for the cost of corrective action. Corrective action will typically require either a pole replacement or the installation of an Osmose extended steel truss (E-truss).

8.8 Joint Use Pole Attachment Audit

Pursuant to FPSC Order No. PSC-06-0351-PAA-EI, Tampa Electric will conduct an audit of all pole attachments on an eight-year cycle at a minimum. For some licensees, Tampa Electric reserves the right to complete this audit annually. The decision to perform an audit on an annual basis will be made by Tampa Electric based on need and cost effectiveness. The purpose of this audit of joint use attachments is to identify the location of each pole and the facilities attached and verification that such attachments are pursuant to a current joint use agreement. The cost of this audit is shared amongst all attaching entities. Tampa Electric tags and identifies all pole locations using a geographical positioning system. If any unauthorized attachments are found, Tampa Electric reserves the right to true-up its pole attachment count and back bill to the last audit unless licensee can provide documentation of an approved permit authorizing the attachment (see Attachment C). Unauthorized attachment fees will also be assessed for any attachments not previously approved. Additionally, licensee will be responsible to pay for a complete engineering study and for any corrective action required to meet Tampa Electric construction standards.

Attachment A

REFERENCES
GR & S
STD 3-1
STD 3-13
DETM
PERMITS
&
EASEMENTS



(VOLTAGES ARE PHASE-TO-GROUND FOR EFFECTIVELY GROUNDED CIRCUITS AND THOSE OTHER CIRCUITS WHERE ALL GROUND FAULTS ARE CLEARED BY PROMPTLY DE-ENERGIZING THE FAULTED SECTION, BOTH INITIALLY AND FOLLOWING SUBSEQUENT BREAKER OPERATIONS.)

* CLEARANCE CODE (SEE ABOVE ILLUSTRATION:)	INSULATED COMMUNICATION CONDUCTORS AND CABLE; MESSENGERS; SURGE-PROTECTION WIRES; GROUNDED GUYS; UNGROUNDED GUYS EXPOSED TO 0 TO 300V; NEUTRAL CONDUCTORS MEETING RULE 230E1; SUPPLY CABLES MEETING RULE 230C1 (FT)	NONINSULATED COMMUNICATION CONDUCTORS; SUPPLY CABLES OF 0 TO 750 V MEETING RULES 230C2 OR 230C3 (FT)	SUPPLY CABLES OVER 750 V MEETING RULES 230C2 OR 230C3; OPEN SUPPLY CONDUCTORS, 0 TO 750 V; UNGROUNDED GUYS EXPOSED TO OVER 300 V TO 750 V (FT)	OPEN SUPPLY CONDUCTORS OVER 750 V TO 22kV; UNGROUNDED GUYS EXPOSED TO 750 V TO 22kV (FT)	OPEN SUPPLY CONDUCTORS ABOVE 22KV. (SEE NOTE 2)
A	18.0	18.0	18.0	18.5	SEE NOTE 2
B	15.5	16.0 ①	16.5 ①	18.5	
C	15.5	16.0 ③	16.5	18.5 ③	
D	9.5	12.0 ①	12.5 ①	14.5	
E	15.5	16.0	16.5	18.5	
F	13.5	14.0	14.5	16.5	

* THE CLEARANCES REQUIRED BY THE UTILITY ACCOMODATION GUIDE (DEPARTMENT OF TRANSPORTATION), CITY, COUNTY OR MUNICIPAL AUTHORITY SHALL GOVERN WHERE MORE CONSERVATIVE.

NOTES:

① WHERE THE HEIGHT OF A BUILDING OR OTHER INSTALLATION DOES NOT PERMIT SERVICE DROPS TO MEET THESE VALUES, THE CLEARANCES MAY BE REDUCED TO THE FOLLOWING (REF. 2002 NESC, TABLE 232-1, NOTE 7&8):

	B	D
INSULATED SERVICE DROPS 300V OR LESS TO GROUND	12.5	10.5
INSULATED DRIP LOOPS OF SERVICE DROPS 300V TO GROUND	10.5	10.5
SERVICE DROPS LESS THAN 150V TO GROUND	12.0	10.0
INSULATED DRIP LOOPS OF SERVICE DROPS 150V TO GROUND	10.0	10.0
INSULATED COMMUNICATION SERVICE DROPS	11.5	—

COLUMN "B" APPLIES TO RESIDENTIAL DRIVEWAYS AND COLUMN "D" APPLIES TO SPACES ACCESSIBLE TO PEDESTRIAN TRAFFIC ONLY.

2. THE TRANSMISSION ENGINEERING DEPARTMENT SHOULD BE CONSULTED FOR CLEARANCE CONSIDERATIONS INVOLVING VOLTAGES EXCEEDING 22KV TO GROUND

③ SEE SPEC. 3-13 FOR CLEARANCE REQUIREMENTS IN GROVES.

REF. 2002 NESC 232

◄ DENOTES LATEST REVISION

NO.	CK'D	DATE	REVISION
3			
2			
1	REM	8-18-05	REVISED NOTE 1

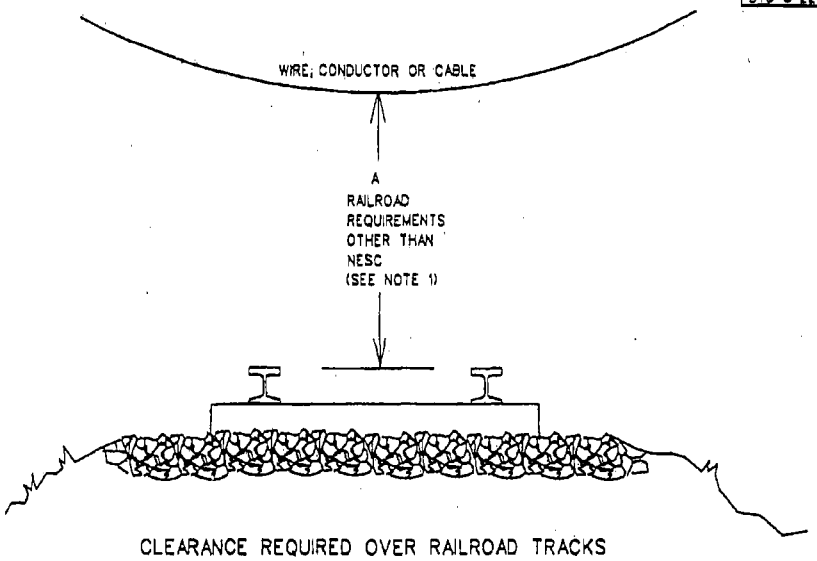
D.E. SUPR. Bob Shirley
APPR. DATE 8-18-05
SUPERSEDES 3-4/5-16-02

VERTICAL CLEARANCE OVER AND ADJACENT TO ROADS, DRIVEWAYS AND OTHER LAND AREAS

3-4

TAMPA ELECTRIC CO. · STANDARDS | GENERAL RULES & SPECIFICATIONS

REFERENCES
GR & S
STD 3-3
STD 3-22



CLEARANCE REQUIRED OVER RAILROAD TRACKS

(VOLTAGES ARE PHASE-TO-GROUND FOR EFFECTIVELY GROUNDED CIRCUITS AND THOSE OTHER CIRCUITS WHERE ALL GROUND FAULTS ARE CLEARED BY PROMPTLY DE-ENERGIZING THE FAULTED SECTION, BOTH INITIALLY AND FOLLOWING SUBSEQUENT BREAKER OPERATIONS.)

CLEARANCE CODE (SEE ABOVE ILLUSTRATION.)	INSULATED COMMUNICATION CONDUCTORS; SURGE PROTECTION WIRES; GROUNDED GUYS; MESSENGERS; EFFECTIVELY GROUNDED NEUTRALS ASSOCIATED WITH CIRCUITS OF LESS THAN 22kV TO GROUND. (FT)	OPEN SUPPLY CONDUCTORS 0 TO 750V (FT)	NON-INSULATED COMMUNICATION CONDUCTORS; INSULATED CABLED SUPPLY CONDUCTORS OF 0 TO 750V WHEN SUPPORTED BY AN EFFECTIVELY GROUNDED BARE MESSENGER (FT)	PRIMARY CONDUCTORS OF 750V TO 15kV TO GROUND. (CIRCUIT MUST BE EFFECTIVELY GROUNDED) (FT)	OPEN SUPPLY CONDUCTORS ABOVE 15kV
A	28.0	28.0	28.0	28.0	SEE NOTE 2

NOTES:

1. CROSSING REQUIREMENTS OF RAILROADS IN OUR SERVICE AREA ARE IN EXCESS OF AND SHALL TAKE PRECEDENT OVER NESC CODE REQUIREMENTS. CROSSING PERMITS AND APPROVAL MUST BE OBTAINED FROM THE RAILROAD INVOLVED. CONTACT PERMITS SECTION. SEE STANDARD 3-3.
2. THE TRANSMISSION ENGINEERING DEPARTMENT SHOULD BE CONSULTED FOR CLEARANCE CONSIDERATIONS INVOLVING VOLTAGES EXCEEDING 15kV TO GROUND.

➤ REF. CSX TRANSPORTATION INC., DESIGN & CONSTRUCTION STANDARD SPECIFICATION, PLATE V, REVISED 9-15-03

NO.	CK'D	DATE	REVISION
3			
2			
1	REM	8-18-05	REVISED CSX REFERENCE DOCUMENT

◄ DENOTES LATEST REVISION

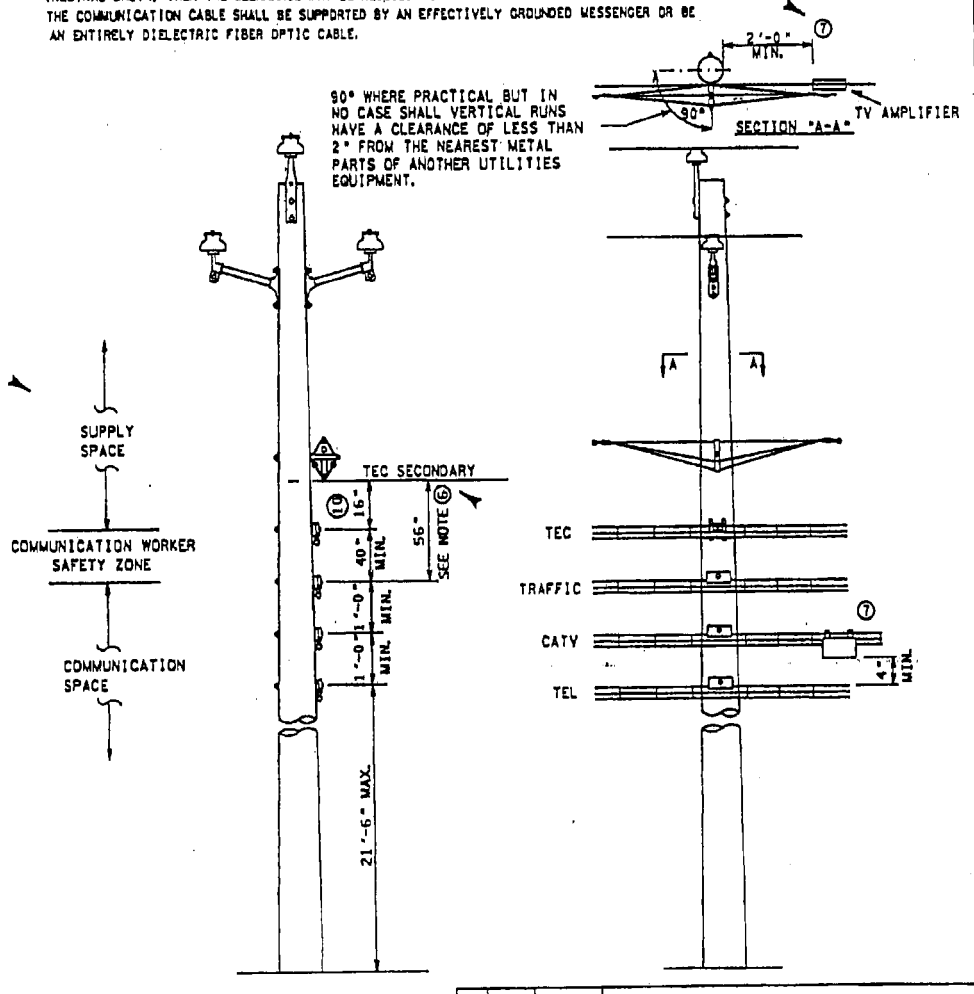
VERTICAL CLEARANCE OVER RAILROADS

D.E. SUPR. Bob Shirley
APPR. DATE 8-18-05
SUPERSEDES 3-5/5-18-02

TAMPA ELECTRIC CO. | STANDARDS | GENERAL RULES & SPECIFICATIONS | 3-5

REFERENCES
GR&S SEC. 8

NOTES:
1. CABLE CLEARANCE MEASUREMENTS SHALL BE TAKEN FROM THE HIGHEST COMMUNICATION CABLE TO THE LOWEST CABLE/CONDUCTOR IN THE SUPPLY SPACE. GROUND CLEARANCE MEASUREMENTS SHALL BE TAKEN FROM THE LOWEST CABLE TO GROUND.
2. THE CATV CABLE ELEVATION MAY BE LOWER WHEN APPROVED BY THE TELEPHONE COMPANY.
3. ELEVATIONS MAY BE LOWERED IF CODE CLEARANCE PERMITS AND UPON THE MUTUAL AGREEMENT OF ALL CABLE OWNERS.
4. ALL COMMUNICATION VERTICAL RUNS OF ALL TYPES SHALL BE PROTECTED AS PER NESC.
5. REFER TO 2002 NESC 235 C (2) (b) (1) (a) FOR SAG RELATED CLEARANCES.
6. IF TEC COMMUNICATION CABLE IS NOT PRESENT, THE 40" DIMENSION IS ALLOWED.
7. ALL CATV EQUIPMENT (SUCH AS AMPLIFIERS, SERVICE DROPS, ETC.) SHALL BE PLACED NO LESS THAN 2'-0" FROM OUTER EDGE OF POLE.
8. ALL GROUNDING AND OVERCURRENT PROTECTION SHALL BE PER APPLICABLE CODES.
9. TEC COMMUNICATIONS CABLE, CATV CABLE, TEL CABLE, AND TRAFFIC CONTROL CABLE, SHALL BE MOUNTED ON THE SAME SIDE OF POLE AS TEC SECONDARY.
10. WHEN THE CONDUCTOR DIRECTLY ABOVE A COMMUNICATION WIRE IN THE SUPPLY SPACE IS A NEUTRAL (NEUTRAL ONLY), THEN THE CLEARANCE MAY BE REDUCED WITH APPROVAL FROM DISTRIBUTION SERVICES. THE COMMUNICATION CABLE SHALL BE SUPPORTED BY AN EFFECTIVELY GROUNDED MESSENGER OR BE AN ENTIRELY DIELECTRIC FIBER OPTIC CABLE.



REF. 2002 NESC 235

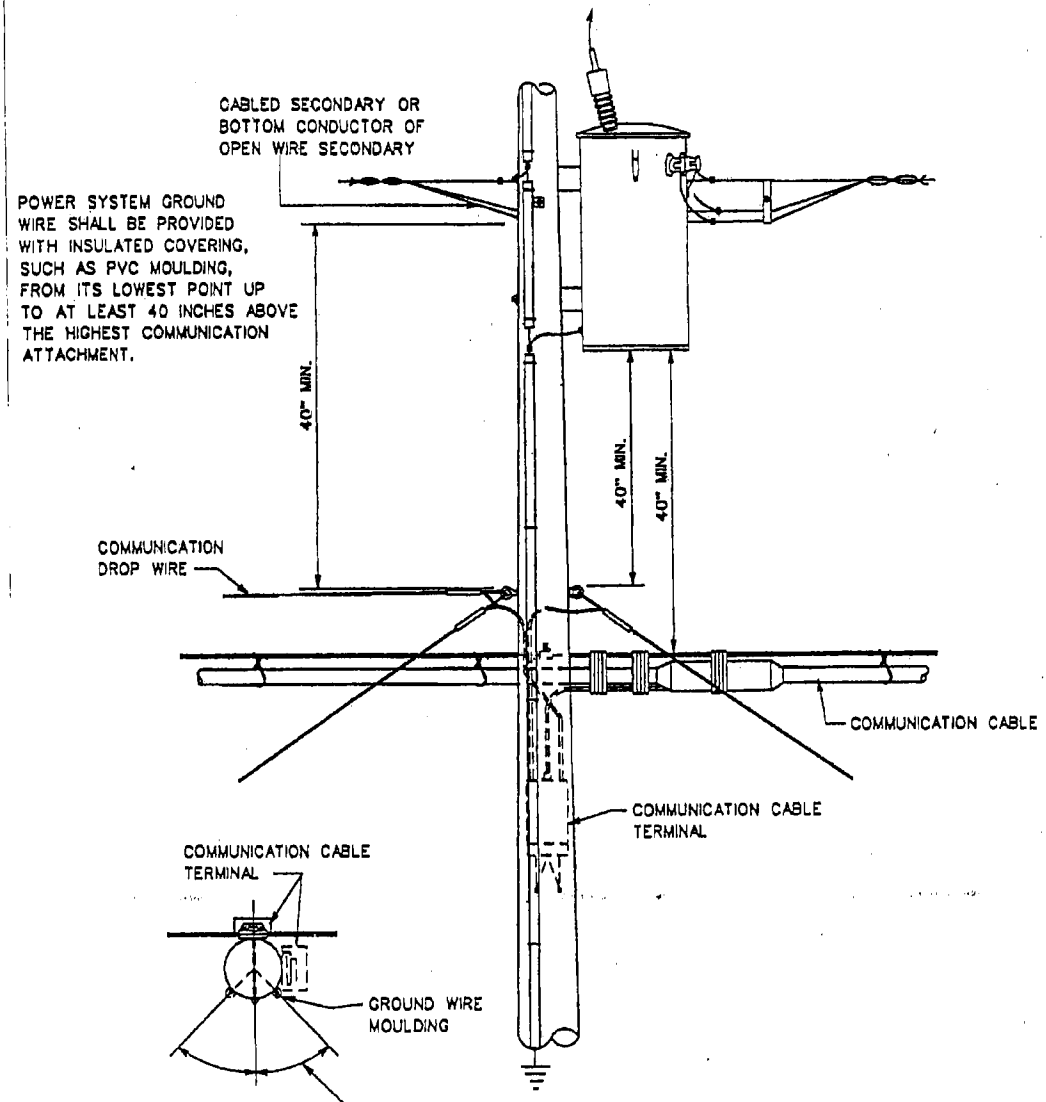
DENOTES LATEST REVISION

NO.	CK'D	DATE	REVISION
3	REM	10-20-05	REVISED TO MEET 2002 NESC
2	REM	8-18-05	ADDED SPACE DISCRIPTIONS
1	REM	8-18-05	REVISED NOTES 1, 4, 5, 6, & 7

CLEARANCE FOR JOINT CONSTRUCTION

D.S. SUPVR. Bob Shilling
APPR. DATE 10-20-05
SUPERSEDES 3-31/8-18-05

TAMPA ELECTRIC CO. | STANDARDS | GENERAL RULES & SPECIFICATIONS | 3-31



◄ DENOTES LATEST REVISION

NO.	CK'D	DATE	REVISION
3			
2			
1	REM	8-18-05	REVISED SHOWING ADDED 93 & 238 TO REF. 2002

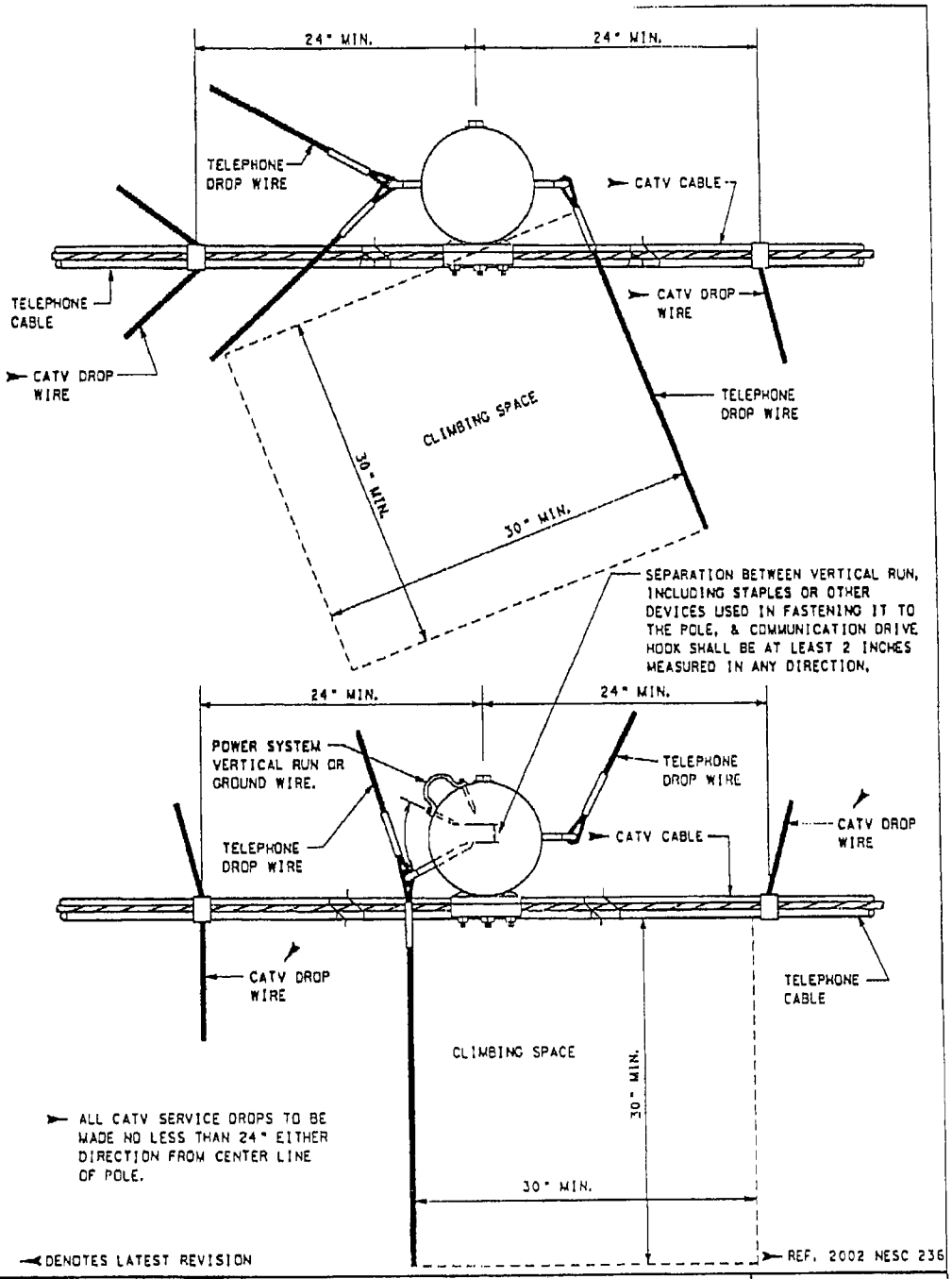
D.E. SUPR. Bob Shuling
APPR. DATE 8-18-05
SUPERSEDES 3-32/5-16-02

3-32

CLEARANCE FOR JOINT CONSTRUCTION

TRANSFORMER POLE

TAMPA ELECTRIC CO. | STANDARDS | GENERAL RULES & SPECIFICATIONS

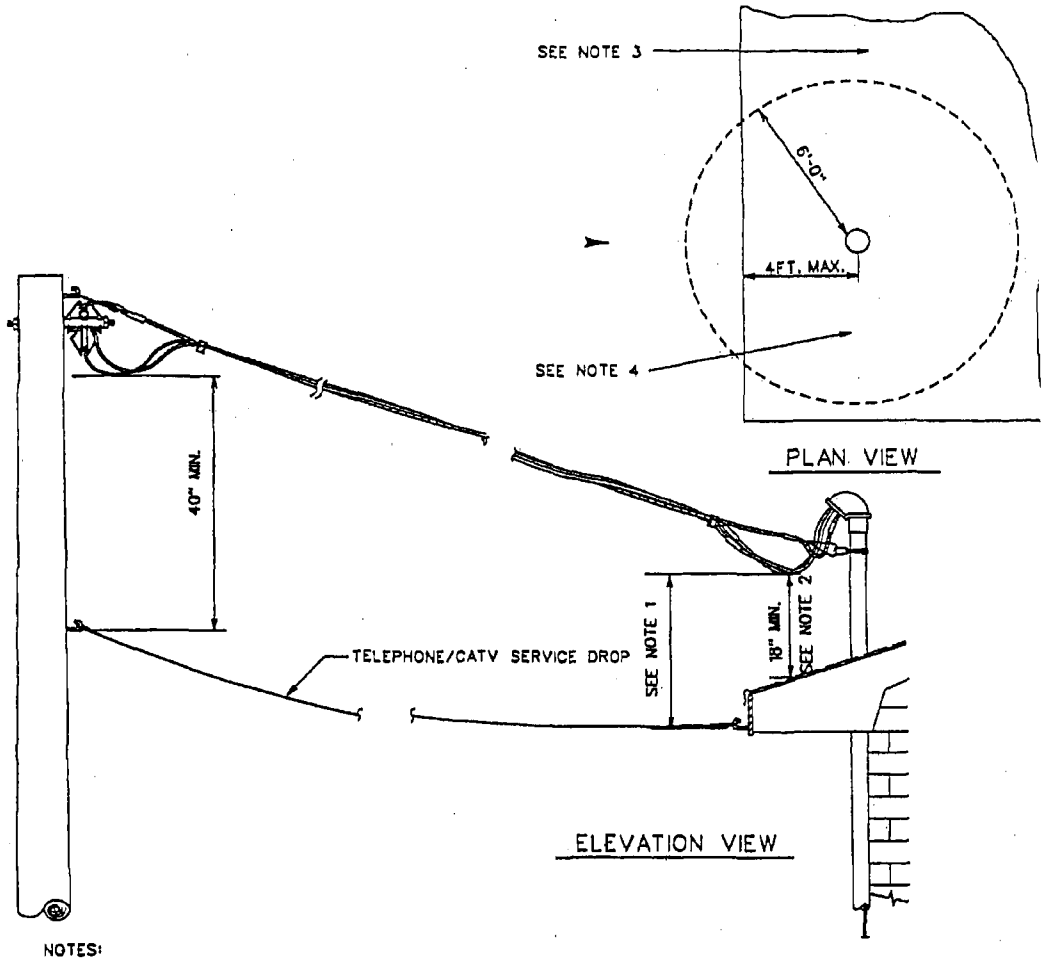


CLIMBING SPACE

THROUGH TELEPHONE AND CATV DROP WIRES

TAMPA ELECTRIC CO.	STANDARDS	GENERAL RULES & SPECIFICATIONS	3-33

VDA: 5-10-5 APPR. DATE 5-16-02 SUPERSEDES 3-33/1-16-97



NOTES:

1. SUPPLY SERVICE DROPS OF 0 TO 750 VOLTS, RUNNING ABOVE AND PARALLEL TO COMMUNICATION SERVICE DROPS, MAY HAVE A CLEARANCE OF NOT LESS THAN 12 IN. AT ANY POINT IN THE SPAN. THIS INCLUDES THE POINT OF ATTACHMENT TO THE BUILDING OR STRUCTURE BEING SERVED, PROVIDED THAT THE NONGROUNDED CONDUCTORS ARE INSULATED AND THAT THE CLEARANCE, AS OTHERWISE REQUIRED BY RULE 235C1 (2002 NESC), IS MAINTAINED BETWEEN THE TWO SERVICE DROPS AT THE POLE.
2. REF. 2002 NESC FIG. 234-2
3. MAINTAIN NOT LESS THAN 3'-0" VERTICAL CLEARANCE ABOVE ROOF OUTSIDE 6'-0" RADIUS FROM THE SERVICE MAST.
4. MAINTAIN NOT LESS THAN 18" VERTICAL CLEARANCE ABOVE ROOF WITHIN 6'-0" RADIUS FROM THE SERVICE MAST.

◄ DENOTES LATEST REVISION

NO.	CK'D	DATE	REVISION
3			
2			
1	REN	8-18-05	ADDED PLAN VIEW & NOTES 3 & 4, REV. NOTE 1

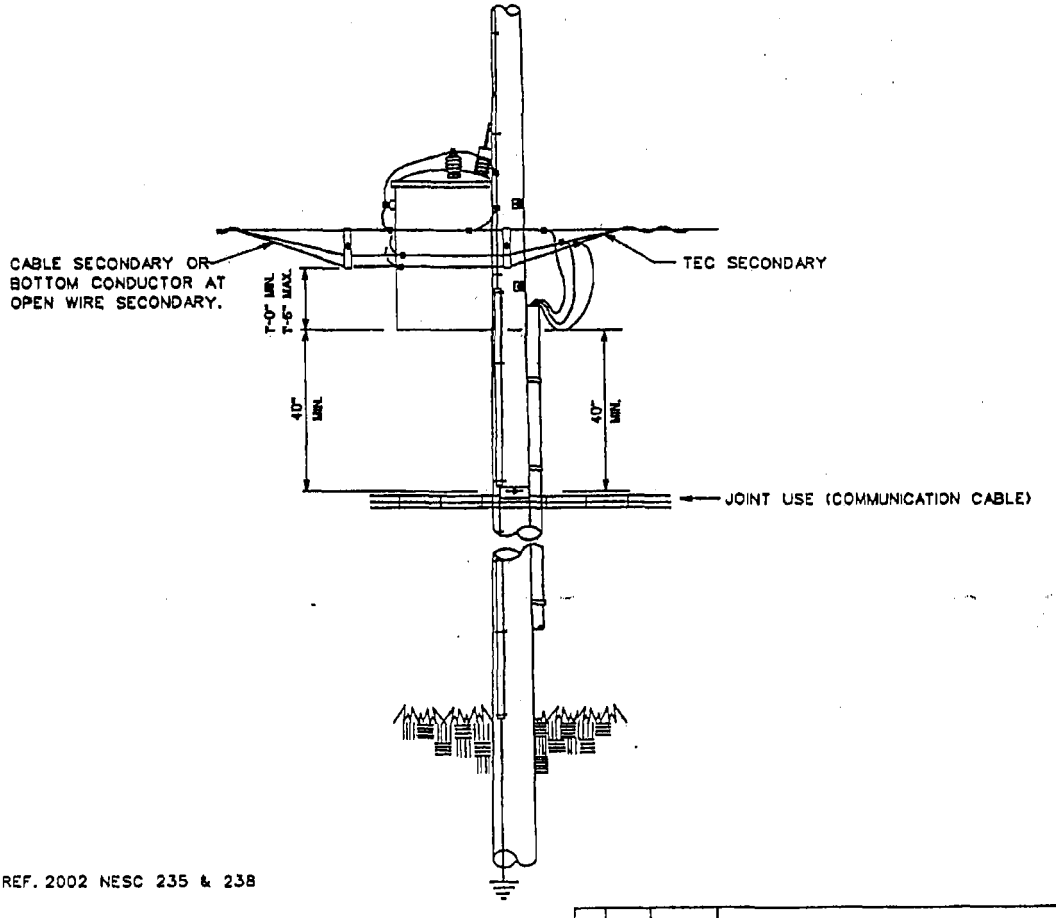
D.S. SUPR. Bob Lindsey
APPR. DATE 8-18-05
SUPERSEDES 3-34/5-16-02

CLEARANCES FOR JOINT CONSTRUCTION SERVICES

3-34 | TAMPA ELECTRIC CO. | STANDARDS | GENERAL RULES & SPECIFICATIONS

NOTES:

1. CABLE CLEARANCE MEASUREMENTS SHALL BE TAKEN FROM THE HIGHEST COMMUNICATION CABLE TO THE LOWEST CABLE/CONDUCTOR IN THE SUPPLY SPACE. GROUND CLEARANCE MEASUREMENTS SHALL BE TAKEN FROM THE LOWEST CABLE TO GROUND.



REF. 2002 NESC 235 & 238

◄ DENOTES LATEST REVISION

NO.	CK'D	DATE	REVISION
3			
2	REM	8-18-05	REVISED NOTE 1
1	SAW	7-22-04	REMOVAL UNDERGROUND CONDUIT, TITLE BLOCK

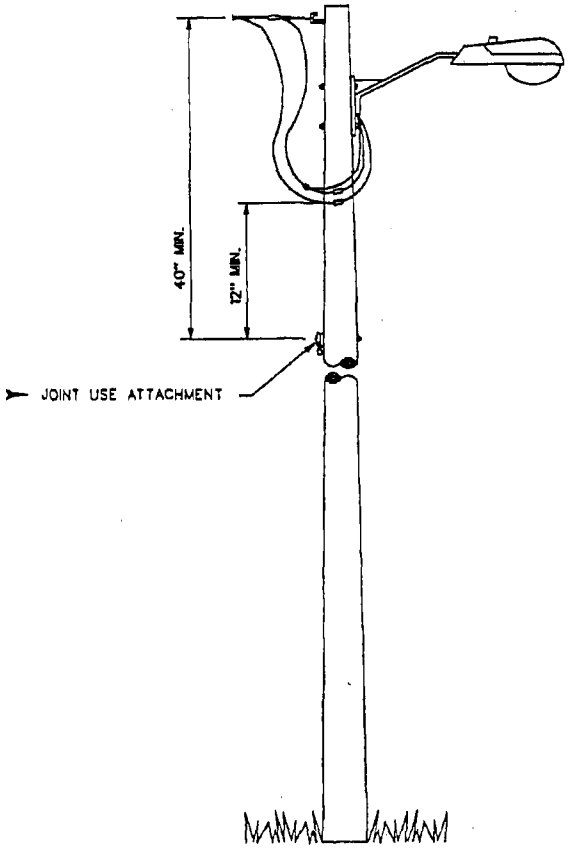
CLEARANCE FROM SERVICE RISER TO JOINT USE ATTACHMENT

D.E. SUPR. Bob Shindler
APPR. DATE 8-18-05
SUPERSEDES 3-35/7-22-04

TAMPA ELECTRIC CO. | STANDARDS | GENERAL RULES & SPECIFICATIONS | 3-35

NOTE:

1. THE SERVICE TO A LIGHT REQUIRES A 40" CLEARANCE TO THE JOINT USE ATTACHMENT. THE DRIP LOOP REQUIRES ONLY A 12" CLEARANCE TO THE JOINT USE ATTACHMENT.



REF. 2002 NESC 238

NO.	CK'D	DATE	REVISION
3			
2	REM	8-18-05	REVISED NOTE 1
1	REM	8-18-05	REVISED JOINT USE BRACKET TO JOINT USE ATTACHMENT

DENOTES LATEST REVISION

D.E. SUPR. Bob Shirley
APPR. DATE 8-18-05
SUPERSEDES 3-36/8-15-02

3-36

CLEARANCE FROM LIGHTS TO JOINT USE ATTACHMENT

TAMPA ELECTRIC CO. | STANDARDS | GENERAL RULES & SPECIFICATIONS

Attachment B

Authorized Representatives:

Tampa Electric Company
Kristina Angiulli
Manager, E.D. Construction Services
P.O. Box 111
Tampa, Fl., 33601
Phone- 813-275-3022
Fax- 813-275-3409

Tampa Electric Company
Karen Laney
Lead Joint Use Field Technician
P.O. Box 111
Tampa, Fl., 33601
Phone- 813-610-1168
Fax- 813-275-3409

Tampa Electric Company
Eric O'Brien
Joint Use Field Technician
P.O. Box 111
Tampa, Fl., 33601
Phone- 813-610-2476
Fax- 813-275-3005

Tampa Electric Company
Nichole Hogan
Joint Use Billing
P.O. Box 111
Tampa, Fl., 33601
Phone-813-275-3072
Fax-813-275-3409

Attachment C

TAMPA ELECTRIC COMPANY

DATE _____

Check all that apply:

( )New
( )Overlash
( )Rebuild
( )Service Drop

( )CATV
( )Phone/Telecommunications
( )Traffic

Licensee Company Name _____
Permit Address (street name and number)
Permit Number (licensee's unique permit ID)
Total # of Poles _____

TECO tracking # _____
Job Order # _____
Date permit received: _____

In accordance with the terms and conditions of the Attachment Agreement between us, dated (date of executed attachment agreement) application is hearby made for a permit to make attachments and to modify agreement by this Exhibit "A" to Tampa Electric Company poles.

Licensee Pole ID Reference # on map	POLE NUMBER (gln or asset tag)	POLE LOCATION (address)	POWER (check if applicable)		Existing ATTACHMENTS (top of pole to bottom)			Licensee Attachment action: N/O/R/S	COMMENTS/SPECIAL INSTRUCTIONS (Photo # if applicable)
			Transmission pole	Distribution pole	Co. "A" (name)	Co. "B" (name)	Co. "C" (name)		
(ID to correlate poles on map)	(10 digit GLN preferred if none, then note the 6 digit asset tag #)	(as specific as possible)						(N=New) (O=Overlash (R=Rebuild) (S=Service	
Cable type:	( ) Coaxial	( )Fiber Optic	Specs:	Cable Size: _____	Cable Wt: _____			Msgr Size: _____ Msgr Wt: _____	

LICENSEE INFORMATION:		TAMPA ELECTRIC USE ONLY:	
Permit Submitted by:		Date Permit Approved:	
Phone:		Approved by: (Signature):	
fax:		Print name:	
Address:		Title:	

DOCKET NO. 060172-EI & 060173-EI
TECO'S STORM HARDENING PLAN
FILED: MAY 1, 2007

Attachment D

Approved TEC tracking #:	(Number found on approved Exhibit A)	**Tampa Electric Company**
Company Name:		Pole Attachment and Contract
Contact Name:		Administration Department
Phone Number:		813-275-3072
Address:		P.O. Box 111
		Tampa , FL 33601

Addition or Removal date (please circle addition or removal)	(date of addition or removal)	**Addition or Removal date** (please circle addition or removal)	
Grid or Pole ID#:	(10 digit GLN preferred if available)	**Grid or Pole ID#:**	
Asset Tag#		**Asset Tag#**	
Location/address of attachment:		**Location/address of attachment:**	
Type of attachment:		**Type of attachment:**	
Addition or Removal date (please circle addition or removal)		**Addition or Removal date** (please circle addition or removal)	
Grid or Pole ID#:		**Grid or Pole ID#:**	
Asset Tag#		**Asset Tag#**	
Location/address of attachment:		**Location/address of attachment:**	
Type of attachment:		**Type of attachment:**	
Addition or Removal date (please circle addition or removal)		**Addition or Removal date** (please circle addition or removal)	
Grid or Pole ID#:		**Grid or Pole ID#:**	
Asset Tag#		**Asset Tag#**	
Location/address of attachment:		**Location/address of attachment:**	
Type of attachment:		**Type of attachment:**	

	Activity	Docket No.	Actual/Estimated Utility Costs						Estimated Benefits to Utility Customers: Impact on Storm Restoration Costs			Estimated Benefits to Utility Customers: Impact on Storm Caused Outages			Other Estimated Company Benefits			Estimated Benefits to Third Party Attachers: Impact on Storm Restoration Costs			Estimated Benefits to Third Party Attachers: Impact on Storm Caused Outages		
			2004	2005	2006	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
(a)	Wooden Pole Inspections.	060078-EI	2.375	3.368	4.714	13.019	16.735	17.551	0.000	0.000	1.539	NQ	NQ	NQ	NQ	NQ	NQ	N/A	N/A	N/A	N/A	N/A	N/A
	Ten Storm Hardening Initiatives.	060198-EI																					
(b)	1 A Three-Year Vegetation Management Cycle for Distribution Circuits		4.832	5.345	9.219	9.577	9.600	9.900	0.000	0.000	10.560	NQ	NQ	NQ	NQ	NQ	NQ	N/A	N/A	N/A	N/A	N/A	N/A
(c)	2 An Audit of Joint-Use Attachment Agreements		0.000	0.000	0.000	0.260	0.260	0.260	0.000	0.000	0.594	NQ	NQ	NQ	0.000	0.059	0.119	N/A	N/A	N/A	N/A	N/A	N/A
(d)	3 A Six-Year Transmission Structure Inspection Program		0.415	0.456	0.567	0.765	1.224	1.266	0.000	0.000	0.519	NQ	NQ	NQ	0.000	0.000	0.017	N/A	N/A	N/A	N/A	N/A	N/A
(e)	4 Hardening of Existing Transmission Structures		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A	N/A	N/A	N/A	N/A	N/A
(f)	5 Transmission and Distribution GIS		0.000	0.655	1.878	2.044	4.644	0.000	0.000	0.000	NQ	0.000	0.000	0.000	0.000	0.000	NQ	N/A	N/A	N/A	N/A	N/A	N/A
(g)	6 Post-Storm Data Collection and Forensic Analysis		0.000	0.000	0.000	0.040	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A	N/A	N/A	N/A	N/A	N/A
(h)	7 Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems		0.000	0.000	0.000	0.000	0.000	0.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A	N/A	N/A	N/A	N/A	N/A
(i)	8 Increased Utility Coordination with Local Governments		0.000	0.007	0.014	0.021	0.028	0.030	NQ	NQ	NQ	0.000	0.000	0.000	NQ	NQ	NQ	N/A	N/A	N/A	N/A	N/A	N/A
(j)	9 Collaborative Research on Effects of Hurricane Winds and Storm Surge		0.000	0.000	0.005	0.020	0.010	0.010	0.000	0.000	0.000	0.000	0.000	0.000	NQ	NQ	NQ	N/A	N/A	N/A	N/A	N/A	N/A
(k)	10 A Natural Disaster Preparedness and Recovery Program		0.000	0.489	0.496	0.476	0.490	0.505	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	N/A	N/A	N/A	N/A	N/A	N/A
	Compliance with National Electric Safety Code's adoption of Extreme Wind Loading Standards.	070297-EI																					
(l)	1 New Distribution Facilities		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(m)	2 Major planned expansion, rebuild, or relocation of distribution facilities		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(n)	3 Critical infrastructure and major thoroughfares		0.000	0.000	0.000	1.002	0.990	1.058	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Mitigating flood and storm surge damage to underground and supporting overhead facilities.	070297-EI																					
(o)	1 Transmission		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(p)	2 Distribution		0.000	0.000	0.000	0.166	0.170	0.174	0.000	0.000	0.675	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(q)	Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance.	070297-EI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	TOTALS		$7.622	$10.320	$16.893	$27.390	$34.151	$31.624	$0.000	$0.000	$13.887				$0.000	$0.059	$0.136						

Notes: All dollars in millions

NQ: Not Quantified - While there are some benefits, Tampa Electric has not been able to quantify these benefits at this time.

NA: Not Available - The information needed to quantify these benefits have not been made available to Tampa Electric at this time.

TAMPA ELECTRIC COMPANY
DOCKET NO. 070297-EI
DOCUMENT 2
EXHIBIT ____ (RBH-1)

Assumptions/Notes

LINE ITEM	
A	Assuming a Cat 3 Hurricane impacting Tampa Electric service area in 2009. Incremental savings based on a reduction in distribution pole failure rate.
B	Assuming a Cat 3 Hurricane impacting Tampa Electric service area in 2009. *CAT 3 hurricane has a severity factor of 16 times CAT 1.* Cost savings based on a reduction in tree related outages due to increased vegetation management.
C	Assuming a Cat 3 Hurricane impacting Tampa Electric service area in 2009. All contracts have been audited and a physical attachment audit is performed on 33% of Tampa Electric's system annually. Cost savings based on reduction in pole failures due to fewer unauthorized attachments overloading poles and causing failures.
D	Assuming a Cat 3 Hurricane impacting Tampa Electric service area in 2009. Incremental savings based on a reduction in transmission pole failure rate.
E	*Costs and benefits of hardening the existing transmission system is included in the Wood Pole Inspection line (a).*
F	New GIS system in-service by year end 2008. While there will be some soft benefits associated with the new GIS system both following a major storm and day to day, the dollars savings has not been quantified.
G	Assuming a Cat 3 Hurricane impacting Tampa Electric service area in 2009. Initial pole database setup cost in 2007 and costs to perform field data collection and analysis in 2009. Benefits will come in years following forensic analysis.
H	*Benefits will come in years following the collection and comparison of data.* Tampa Electric will also utilize current PURC joint research underground study to quantify benefits.
I	Assuming a Cat 3 Hurricane impacting TECO service area in 2009. While there will be benefits to improved coordination, the dollar savings has not been quantified.
J	Costs based on Tampa Electric's cost allocation of current three PURC joint research projects. Benefits will come in years following study results and implementation of any actions from research.
K	Tampa Electric had a substantial Natural Disaster Preparedness and Recovery Program in place prior to the new FPSC storm hardening rules, therefore, no major changes have been implemented and thus there are no incremental costs or benefits.
L	All distribution facilities are and have been built to NESC Construction Grade B. No changes have been implemented and thus there are no incremental costs or benefits.
M	All new, planned expansion, rebuild, and relocation of distribution facilities are built to NESC Construction Grade B. No changes have been implemented and thus there are no incremental costs or benefits.
N	Tampa Electric will convert several OH interstate crossings to underground and will rebuild circuits feeding the Port of Tampa and the Saint Joseph's Hospital as part of its pilot program to evaluate the NESC Extreme Wind criteria.
O	No changes have been implemented and thus there are no incremental costs or benefits.
P	Test and repair, if needed, 18 network protector seals in flood prone submersible vaults. Assuming a Cat 3 Hurricane impacting Tampa Electric service area in 2009. Costs include incremental increases for the installation of new stainless switchgear and maintenance replacements. Savings based on reduction in failures during Cat 3.
Q	Tampa Electric has been placing its new distribution facilities in locations, typically front of properties in public ROW, to facilitate safe and efficient access for installation and maintenance of the system prior to FPSC storm hardening initiatives. Tampa Electric will evaluate the replacement and relocation of rear lot facilities during maintenance or storm repairs with input and agreement from homeowners and third party attachers. No major projects are anticipated, thus there are no incremental costs or benefits.

TAMPA ELECTRIC COMPANY
DOCKET NO. 070297-EI
DOCUMENT 3
EXHIBIT ____ (RBH-1)

PROCESS TO ENGAGE THIRD PARTY ATTACHERS

1. The electric utility and third party attachers will engage in a continuous dialogue on the status of the electric utility's storm hardening plans. A third party attacher who wishes to be part of this process shall provide a one-time notification in writing to the electric utility, providing the name and address of the person designated to receive communications from the electric utility. This continuous dialogue shall, at a minimum, include:

   A. The electric utility shall provide notification to third party attachers by June 30 of specific storm hardening projects that the electric utility contemplates undertaking in the following calendar year. This notification shall include the project name, physical location (maps and routes) and general description of extent and type of work to be done. The most current engineering plans and diagrams should be provided as soon as they are available. Conferences on the proposed projects will be held if requested by any party.

   B. Third party attachers shall submit their respective cost-benefit analyses and any suggested modifications to the storm hardening projects identified to the electric utilities as contemplated by Rule 25-6.0342 by September 30.

   C. The electric utility will update third party attachers by November 15 of storm hardening projects proposed to be implemented in the following calendar year. This update shall include all of the descriptions of the projects (including, but not limited to, the most current engineering plans and diagrams and whether the electric utility plans to replace poles, change from wood poles to concrete or steel

poles, place poles in locations different from the existing poles, relocate aerial facilities or underground existing aerial facilities) and costs proposed to be included in the electric utility's budget for the next calendar year. Third party attachers shall provide the electric utility any further comments on the proposed projects by December 5. Further conferences on the proposed projects will be held if requested by any party.

D. By December 15, the electric utility shall file with the Director of the Commission's Division of Economic Regulation and interested parties who have provided written notice requesting to be notified: the project name; physical location (maps and routes and a general description of extent and type of work to be done); allowable cost range; and cost benefit analysis for storm hardening projects to be implemented in the following calendar year.

E. Interested parties or the Commission Staff shall state any specific objections to the plan by February 1 and request that the specific objections be brought before the Commission for review. Only that portion of the plan which is the subject of an objection shall be brought before the Commission for review.

F. Extensions of time may be granted by Staff of any of the deadlines provided herein in the event of hurricanes, other catastrophes or other good cause stated.

2. The electric utility will file with the Florida Public Service Commission by March 1 each year a status report of its implementation of its Storm Hardening Plan, and any project modifications to its storm hardening plans that are planned to be undertaken in the remaining years of its filed plan. Included in the status report for storm hardening

projects undertaken in the current calendar year shall be the project name, the routes and circuits affected, any comments on the project received from third party attachers, the costs and benefits of the project and whether the project was previously identified in the company's storm hardening plan.

3. Within 30-days after an electric utility's identification of any new storm hardening projects not listed in the electric utility's three-year Storm Hardening Plan filed in accordance with Rule 25-06.0342(2), Fla. Admin. Code, the electric utility will provide third party attachers a general description of any new projects under consideration and seek comment on the project.

SCANNED

Progress Energy

Storm Hardening Plan
2007 – 2009

May 7, 2007

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070298-EI EXHIBIT 9
COMPANY PEF (Direct)
WITNESS Jason Cutliffe (JC-1T)
DATE 10/02-03/07

Docket No. 060172-EI
Docket No. 060173-EI

I. Introduction:

Rule 25-6.0342, Florida Administrative Code, requires investor-owned electric utilities in Florida to file a Storm Hardening Plan with the Florida Public Service Commission ("FPSC") on or before May 7, 2007 and every three years thereafter as a matter of course. Rule 25-6.0342 specifies what must be included in utility storm hardening plans, and Progress Energy Florida, Inc. ("PEF") has tracked those rule provisions in its Storm Hardening Plan below:

25-6.0342(3): *Each utility storm hardening plan shall contain a detailed description of the construction standards, policies, and procedures employed to enhance the reliability of overhead and underground electrical transmission and distribution facilities.*

PEF's construction standards, policies, practices, and procedures related to storm hardening issues are listed below and are attached hereto as Attachment A:

Distribution OH Construction Manual

i. Cover page
   1. *Addresses NESC adherence standards.*
ii. General Overhead section
   1. *Discusses company policy on extreme wind.*
   2. *Details Florida's extreme wind contour lines.*
   3. *Discusses the use of the Pole Foreman program.*
iii. Guys and Anchors Section
   1. *Discusses PEF's standard pole strengths, sizes, and limitations.*
iv. Primary Construction section
   1. *Discusses corporate practices for primary line construction.*
v. Coastal and Contaminated area section
   1. *Discusses corporate practices for primary line construction in coastal areas.*

Distribution UG Construction Manual

vi. Cover page
    1. *Addresses NESC adherence standards.*
vii. Underground General Section
    1. *Discusses location of UG facilities in accessible locations.*
viii. OH-UG Transition section
    1. *Discusses corporate practices for primary framing on dip poles.*
ix. Trenching and Conduit section
    1. *Discusses corporate practices for trenching and use of conduit on primary UG circuits.*
x. Pads & Pullboxes Section
    1. *Discusses corporate practices for the placement and installation of transformer & switchgear pads and boxes.*
xi. Enclosures & Pedestals Section
    1. *Discusses corporate practices for the placement and installation of pedestals and secondary termination cabinets.*
xii. Cable Accessories Section
    1. *Discusses corporate procedures for the installation of UG terminations in non-storm surge areas.*
xiii. Flooding and Storm Surge Requirements
    1. *Discusses corporate procedures for the installation of UG equipment in areas targeted for storm surge hardening.*

Distribution Engineering Manual

xiv. Overhead Design guide section
    1. *Addresses line location in accessible location.*
    2. *Addresses NESC compliance.*
    3. *Discusses Pole Foreman program.*
xv. Underground Design guide section
    1. *Addresses line location in accessible location.*
    2. *Addresses NESC compliance.*

Transmission - Extreme Wind Loading Design Criteria Guideline for Overhead Transmission Line Structures

xvi. Standards Position Statement

1. *Addresses NESC compliance.*
2. *Addresses American Society of Civil Engineer's Manual 74 (ACSE 74).*
3. *Discusses transmission line importance for reliability.*
4. *Details Florida's extreme wind contour lines.*

Transmission - Line Engineering Design Philosophy

xvii. Overhead Line Design philosophy

1. *Addresses NESC compliance.*
2. *Addresses insulator loading criteria.*
3. *Addresses guy / anchor capacity ratings.*
4. *Addresses design load cases.*
5. *Addresses extreme wind guidelines.*
6. *Addresses structural guidelines.*

Joint Use – Pole Attachment Guidelines and Clearances

xviii. Pole Attachment Guidelines

1. *Addresses Pole Attachment and Overlash Procedures.*
2. *Addresses Joint Use Construction.*
3. *Addresses Guys and Anchors.*

xix. Joint Use Clearances

1. *Addresses Line Clearances.*
2. *Addresses Joint Use Clearances.*

In addition to the standards, practices, policies, and procedures identified above, PEF's Wood Pole Inspection Plan, Vegetation Management Plan, and Ongoing Storm Preparedness Plan all contain standards, practices, policies, and procedures that address system reliability and issues related to extreme weather events. These plans are included herewith as Attachment B.

25-6.0342(3)(a): *Each filing shall, at a minimum, address the extent to which the utility's storm hardening plan complies, at a minimum, with the National Electric Safety Code that is applicable pursuant to subsection 25-6.0345(2), F.A.C.*

All standards, practices, policies, and procedures in the manuals and plans listed above are based on accepted industry practices designed to meet or exceed the requirements of the National Electric Safety Code (NESC). These standards, practices, policies, and procedures are followed on all new construction and all rebuilding and relocations of existing facilities.

25-6.0342(3)(b): *Each filing shall, at a minimum, address the extent to which the utility's storm hardening plan adopts the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC for new construction, major planned work, and critical infrastructure.*

New Construction:

PEF has extensive service experience with Grade C and Grade B construction standards as defined by the NESC. That experience, which includes the 2004 and 2005 hurricane seasons and other severe weather events, indicates that properly constructed and maintained distributions lines meeting all provisions of the NESC perform satisfactorily and provide a prudent and responsible balance between cost and performance. PEF's design standards can be summarized as: 1) quality construction in adherence with current NESC requirements, 2) well defined and consistently executed maintenance plans, and 3) prudent end-of-life equipment replacement programs. When these elements are coupled with a sound and practiced emergency response plan, construction grades as defined by the NESC provide the best balance between cost and performance.

With these facts in mind, extreme wind standards have not been adopted for all new distribution construction. It is important to note that section 250C of the 2007 version of the NESC calls for the extreme wind design standard only for distribution poles in excess of sixty feet in height. Thus, the NESC itself, the source of Figure 250-2(d), makes clear that the extreme wind standard does not apply to typical distribution construction. In fact, the NESC rules committee engaged in extensive studies regarding the application of the extreme wind

standard to distribution poles prior to the 2007 version of the NESC being issued and the rules committee found that based on current research, data and information, there is no known benefit to applying the extreme wind standard of construction to distribution poles. See Exhibit 4, Docket No. 060172-EU, August 31, 2006 Workshop (Attachment C hereto).

In addition to the NESC Rules Committee findings, all credible research that PEF is aware of shows that there is no benefit to applying the extreme wind standard to distribution construction. See, e.g., Exhibit 4, Docket No. 060172-EU, August 31, 2006 Workshop (Attachment C hereto); Testimony of Mr. Nelson Bingel, Docket No. 060173-EU, April 17, 2006 Workshop at pages 51-70 (Attachment D hereto); Testimony of Dr. Larry Slavin, Docket No. 060173-EU, August 31, 2006 Workshop at pages 2-59 (Attachment E hereto); Composite Materials Regarding Extreme Wind Construction (Attachment F hereto). Utility experience from around the country further indicates that electrical distribution structures under sixty feet in height are damaged in extreme wind events by trees, tree limbs, and other flying debris. See 2007 NESC Subcommittee Decision Regarding CP2766. Thus, applying the extreme wind standard to distribution poles results in large increases in cost and design complexity without a commensurate benefit. See id.

In addition to the fact that PEF has not seen any objective data supporting the application of the extreme wind standard to distribution-level construction, PEF's individual experience in the 2004 and 2005 storm seasons showed that PEF's distribution system performed well in all the multiple hurricanes and tropical storms that impacted PEF's system during those years. PEF's experience was consistent with that of the other utilities around the nation who found that vegetation and flying debris were the main causes of distribution pole damage, a condition that the extreme wind standard will not address. With respect to pure wind-caused pole damage, PEF found that wind events such as tornados and "micro-bursts" were responsible, and even transmission poles designed to meet or exceed the extreme wind standard failed under those "super extreme" wind conditions. See, e.g., Attachment G hereto.

While no current data or research supports the application of the extreme wind standard to distribution pole construction, PEF, as discussed in detail below, will analyze the extreme wind standard along with other grades of distribution construction by using its Asset Investment Strategy model for implementation purposes in selected locations throughout PEF's service

territory. In conjunction with wind measuring devices and other data collection devices, PEF will study the performance of various grades of distribution construction at these various sites and will compare and analyze any information collected throughout the year from any storms or extreme weather that PEF may encounter. From this process, PEF expects to continue to learn and adapt its extreme weather strategy based on information that it will collect and based on the information gathered by other utilities in Florida and throughout the nation as new standards and applications are applied and tested.

With respect to new construction for transmission poles, PEF's transmission department is building all new construction with either steel or concrete pole material. Virtually all new transmission structures exceed a height of sixty feet above ground and therefore will be constructed using the NESC Extreme Wind Loading criteria.

Major planned work:

For the reasons discussed in the new construction section above, PEF has not adopted the extreme wind standard for major planned work, including expansions, rebuilds, or relocations of existing facilities in the distribution system. Consistent with NESC Rule 250C, PEF will use the extreme wind standard for all major planned transmission work, including expansions, rebuilds, and relocations of existing facilities.

Critical infrastructure:

PEF first notes that Rule 25-6.0342 does not provide a definition of what "critical infrastructure" means, so that term is susceptible to various subjective definitions throughout the investor-owned electric utilities in Florida. Under any definition, however, PEF, for the reasons discussed in the new construction section above, has not adopted the extreme wind standard for any of its distribution level infrastructure. Again PEF and industry experience shows that flying debris and vegetation are the primary causes of distribution pole damage, and these are conditions that the extreme wind standard, and any other overhead construction standard, cannot address. Thus, placing distribution poles constructed to extreme wind standards around facilities such as hospitals and police stations in PEF's service territory would unnecessarily increase costs and restoration time if those poles are knocked down by falling trees or flying debris such as

roofs or signs. Additionally, PEF's experience in the 2004 and 2005 hurricane seasons and other extreme weather events showed that even with pure wind-based pole impacts, PEF's current level of construction, around critical facilities and around all other facilities, performed well and any pole failures due solely to wind impact were caused by "super extreme" wind events such as tornados and "micro bursts," conditions that would have caused and did cause extreme wind construction to fail as well. As part of PEF's effort to gain more experience and information with various hardening construction options, however, PEF, as discussed more fully below, plans to underground up to nineteen major highway crossings and is working with several coastal communities in Pinellas County to underground portions of PEF's distribution system, which will help mitigate the impact of flying debris and super extreme weather events.

With respect to transmission, virtually all new transmission structures exceed a height of sixty feet above ground and therefore are constructed using the NESC extreme wind loading criteria. Accordingly, PEF will use the extreme wind standard for all major planned transmission work, including expansions, rebuilds, and relocations of existing facilities, irrespective of whether they can be classified as "critical" or "major."

25-6.0342(3)(c): *Each filing shall, at a minimum, address the extent to which the utility's storm hardening plan is designed to mitigate damage to underground and supporting overhead transmission and distribution facilities due to flooding and storm surges.*

Based on PEF's experience in the 2004 and 2005 hurricane seasons, along with the experiences of other utilities in Florida reported to the FPSC after those seasons, PEF has concluded that underground applications may not be best suited for all areas. For example, in the FPSC sponsored storm hardening workshops in 2006, Gulf Power Company reported that during the 2005 hurricane season, some of its underground assets and equipment were actually washed out to sea in some of its costal communities, and that overhead equipment may have made more sense in those areas with regard to restoration and safety. See Attachment H. Similarly, PEF has identified areas in its service territory where current underground equipment should be replaced with overhead due to the fact that those areas are subject to frequent and prolonged flooding resulting in damage from water intrusion on underground equipment. Thus, one of PEF's most effective tools in its hardening arsenal is to identify areas where underground equipment should

not be used, and PEF's hardening plan takes this fact into account.

In areas where underground equipment may be exposed to minor storm surge and/or shorter term water intrusion, however, PEF has used its Asset Investment Strategy Model (discussed in detail below) to identify areas where certain mitigation projects will be put into place to test whether flood mitigation techniques and devices can be used to protect equipment such as switchgears, padmounted transformers and pedestals. In these selected project sites, PEF will test:

- Stainless steel equipment;
- Submersible connectors;
- Raised mounting boxes;
- Cold shrink sealing tubes; and
- Submersible secondary blocks.

Throughout the year, PEF will monitor these installations to collect and analyze data to determine how this equipment performs relative to PEF's current design with respect to outage prevention, reduced maintenance, and reduced restoration times. From this process, PEF will continue to learn and will adapt its flood and storm surge strategies based on information that it will collect and based on the information gathered by other utilities in Florida and throughout the nation as new standards and applications are applied and tested.

In addition to the actions discussed above, during major storm events, substations that are in the forecast strike zone will have sandbags placed in strategic areas to attempt to eliminate water intrusion into control houses. In the event of water intrusion causing extensive damage requiring prolonged repair, PEF will employ mobile substations to affected areas, where possible, in order to restore power.

25-6.0342(3)(d): *Each filing shall, at a minimum, address the extent to which the utility's storm hardening plan provides for the placement of new and replacement distribution facilities so as to facilitate safe and efficient access for installation and maintenance pursuant to Rule 25-6.0341, F.A.C.*

PEF will continue to use front lot construction for all new distribution facilities and all replacement distribution facilities unless a specific operational, safety, or other site-specific reason exists for not using such construction at a given location. See Distribution Engineering Manual, Section xv(1).

25-6.0342(4): *Each utility storm hardening plan shall explain the systematic approach the utility will follow to achieve the desired objectives of enhancing reliability and reducing restoration costs and outage times associated with extreme weather events.*

As part of its systematic approach to storm hardening, PEF engaged industry expert Davies Consulting ("DCI") in developing a comprehensive prioritization model that will help PEF identify potential hardening projects, procedures, and strategies.
DCI has worked with a number of utilities nationally to evaluate their power delivery system major storm preparedness. They have also evaluated options for infrastructure hardening to improve performance and reliability not only day-to-day, but also during major storms. Collaborating with DCI, PEF created an evaluation framework for various hardening options and prioritization of potential alternatives.

PEF and DCI worked together to load and analyze potential hardening alternatives into DCI's proprietary Asset Investment Strategy ("AIS") model. The model is based on a structured methodology for evaluating the costs and benefits associated with various hardening options. The AIS model evaluates potential hardening options based on several sets of criteria and variables and gives those hardening options a "score" that PEF can use to identify highest value projects, policies, and procedures for storm hardening. PEF and DCI worked together to develop an evaluation template used to determine specific costs and benefits associated with each hardening alternative identified. The following components of the evaluation framework were established:

- Financial parameters for PEF (e.g., discount rates, allowable return, tax rates, depreciation schedules, etc.);

- Key strategic criteria for the evaluation (e.g. financial, customer satisfaction, storm

restoration effectives, etc);

- Specific key attributes that will be evaluated for each hardening alternative;

- Hard and soft dollar cost and benefits (e.g., cost per mile underground, cost of pole upgrades, cost per avoided storm interruption);

- Qualitative attribute evaluation questions (e.g., customer satisfaction, safety, quicker restoration of critical infrastructure, etc.);

- Relative weights across the attributes; and

- Long term costs and benefits of the initiatives.

Under the foregoing components of the evaluation framework, the AIS model is set up to analyze the following hardening alternatives for PEF:

- OH-to-UG Conversions
  - Taking existing overhead (OH) electric lines and facilities and placing them underground (UG) via the use of specialized UG equipment and materials. The primary purpose of this hardening activity is to attempt to eliminate tree and debris related outages in the area of exposure. When applied to crossings on major highways, this hardening activity can also mitigate potential interference with first responders and other emergency response personnel caused by fallen lines.
- Small Wire Upgrade
  - The conversion of an existing overhead line currently with either #4 or #6 conductor to a thicker gauge conductor of 1/0 or greater. The primary purpose of this hardening activity is to attempt to utilize stronger conductor that may be better able to resist breakage from falling tree branches and debris.
- Backlot to Frontlot Conversion
  - Taking an existing overhead line located in the rear of a customer's

property and relocating it to the front of the customers property. This involves the removal of the existing line in the rear of the property and construction of a new line in the front of the property along with re-routing service drops to individual customer meters. The primary purpose of this hardening activity is to minimize the number of tree exposures to the line to prevent outages and to expedite the restoration process by allowing faster access in the event an outage occurs.

- Submersible UG
  - Taking an existing UG line and equipment and hardening it to withstand a storm surge via the use of the current PEF storm surge standards. This involves the use of specialized stainless steel equipment and submersible connections. The primary purpose of this hardening activity is to attempt to minimize the damage caused by a storm surge to the equipment and thus expedite the restoration after the storm surge has receded.
- Alternative NESC Construction Standards
  - Building OH line and equipment segments to grade B construction or the extreme wind standard as shown in the NESC extreme wind contour lines of figure 250-2(d). This will be done via the use of the current PEF grade B and extreme wind standards which call for the use of the industry accepted Pole Foreman program to calculate the necessary changes. Typical changes include shorter span lengths and higher class (stronger poles). The primary purpose of this hardening activity is to attempt to reduce the damage caused by elevated winds during a major storm. Locations have been chosen to provide contrasting performance data between open costal and inland heavily treed environments.

The key strategic criteria that the AIS model uses to evaluate these five potential hardening options are:

- Financial Cost
  - Provides the financial value of the proposed project based on Net

Present Value (NPV) of total costs associated with the project (Capital and O&M) and associated potential benefits such as avoided O&M costs, avoided outages, etc.

- Major Storm Impact
  - Determines the potential benefits that the project provides during a major storm based on reduced damages or the ability to restore power more rapidly.
- Community Storm Impact
  - Evaluates the potential benefits that the proposed project will have on a community's ability to cope with damage.
- Third Party Impact
  - Captures complexities of proposed projects in terms of coordination with third parties such as telecommunication, Cable TV, permitting, costs, etc.
- Overall Reliability
  - Captures the overall potential reliability benefits that the project provides on an on-going basis in terms of reduced customer interruptions and outage duration.

Finally, in evaluating potential hardening options, the AIS model is set up to address the following hardening project questions:

- At the end of this project, what percent of the exposure will be hardened?
- How many customers are served from this device?
- What will be the impact of this project on the restoration time during major storm?
- What is the annual probability of wind over 70 mph in the area served by this device?
- At what level of hurricane will the area served by the device flood due to storm surges?
- What is the tree density in the area served by this device?
- What level of tree damage will this project mitigate during a major storm?
- How many critical customers does this project address?

- How valuable will the project be to the community?
- What are any major obstacles/risks for completing the project this year?
- What type of investment, if any, is required by joint users to complete this project?
- What is the three year average CEMI4 number of customers on this feeder?
- How many customer outages will this project potentially eliminate annually?
- What is the potential change in the annual CAIDI that this project will result in?
- Will this project potentially reduce the number of momentary customer interruptions on this section?
- What will be the potential change in the number of customers experiencing outages longer than three hours as a result of this project?

In implementing the AIS framework, DCI worked with PEF to challenge some of the assumptions used in the model and to provide industry experience and expertise to ensure that the benefits and cost estimates used were accurate and realistic. DCI also worked with PEF in developing various "what-if" scenarios and assessed different funding options at the portfolio level. This helped assess whether the proposed alternatives were maximizing the total value of the portfolio.

PEF is using the AIS model to ensure a systematic and analytical approach to deploying hurricane hardening options within its service territory. For proven hardening options that PEF is already using as part of its construction standards and policies, the AIS model will help PEF best locate and prioritize areas within its system where those options should be used. For unproven or experimental hardening options, such as the extreme wind standard for distribution pole construction, PEF is using the AIS model to identify areas within its service territory where analytical data collection projects can be used to evaluate the performance and results of such hardening options. Examples of specific projects taking place in 2007 are discussed below.

25-6.0342(4)(a): *A description of the facilities affected, including technical design specifications, construction standards, and construction methodologies employed.*

All of PEF's facilities are affected to some degree by the standards, policies, procedures, practices, and applications discussed throughout this document. Specific facilities are also addressed herein in detail (i.e. upgrading all transmission poles to concrete and steel, using front lot construction for all new distribution lines where possible). Technical design specifications, construction standards, and construction methodologies are specifically discussed at pages 1 through 3 of this plan and are included in Attachments A and B.

25-6.0342(4)(b): *The communities and areas within the utility's service area where the electric infrastructure improvements are to be made.*

As discussed above, all of PEF's facilities are affected to some degree by the standards, policies, procedures, practices, and applications discussed throughout this document, so all of areas of PEF's service territory are impacted by PEF's storm hardening efforts. With respect to specific projects that employ some or all of the hardening options that PEF has identified based on its recent storm experience and/or though the AIS system, please see the following:

Distribution:

OpCenter	Project Name	Sub Category
Monticello	St George Is – Plantation	Submersible UG
Apopka	US 441 west of Hwy 19	OH to UG Conversion
Seven Springs	Floramar Subdivision	Submersible UG
Longwood	I-4 @ Oranole Road/Lake Destiny Dr.	OH to UG Conversion
Inverness	Homosassa – Riverhaven	Submersible UG
Inverness	US 98 – Brooksville	Small Reconductor
St Petersburg	Coquina Key	Small Reconductor

Monticello	A192 – Luraville	Small Reconductor
Clearwater	Indigo	Small Reconductor
Ocala	US 301 – Citra	Small Reconductor
St Petersburg	Feeder X220	Extreme Wind Upgrades
SE Orlando	Sprint Earth Station & Cocoa Water Wells	Small Reconductor
Lake Wales	Highland Park	Small Reconductor
Lake Wales	Hibiscus Feeder Tie	Small Reconductor
Inverness	R448 – Dunnellon	Back lot to Front lot conversion
SE Orlando	Hoffner Ave and feeder Tie	Small Reconductor
SE Orlando	Holden Ave E) Orange Blossom Trail	Small Reconductor
Buena Vista	Calle De Sol	OH to UG Conversion
Jamestown	SR-408 @ Woodbury Rd	OH to UG Conversion
Buena Vista	Winderlakes	OH to UG Conversion
SE Orlando	Florida Turnpike @ Sandlake Rd (746')	OH to UG Conversion
Buena Vista	OH Crossing of Turnpike (K68 @K5255)	OH to UG Conversion
Longwood	Us 17/92 & SR-436	OH to UG Conversion
SE Orlando	OH Cross of Trnpke 2 (K1780 @ K6434991 and K1775 @ K5021)	OH to UG Conversion
SE Orlando	Florida Turnpike @ Sandlake Rd (485')	OH to UG Conversion
SE Orlando	OH Crossing of Turnpike (K1780 @K2379)	OH to UG Conversion
SE Orlando	OH Crossing of Turnpike (K1025 @ K1025 & K1028 @ K128)	OH to UG Conversion
Longwood	I-4 @ SR-436	OH to UG Conversion
SE Orlando	Florida Turnpike @ Orange Blossom Trail	OH to UG Conversion
Longwood	I-4 @ EE-Wiliamson Rd	OH to UG Conversion
Longwood	I-4 @ SR-434	OH to UG Conversion
Eustis	I-4 @ Lee Rd	OH to UG Conversion
Longwood	I-4 @ Kennedy Blvd	OH to UG Conversion
Longwood	I-4 @ North St	OH to UG Conversion
Longwood	I-4 @ Fairbanks Ave	OH to UG Conversion
Longwood	I-4 @ Orange St.	OH to UG Conversion

With regard to system hardening projects in general, PEF's approach is to consider the unique circumstances of each potential location considered for hardening by taking into account variables such as:

- operating history and environment;
- community impact and customer input;
- exposure to storm surge and flooding;
- equipment condition;
- historical and forecast storm experience; and
- potential impacts on third parties;

This surgical approach leads to the best solution for each discrete segment of the delivery system.

For example, PEF has identified areas in its service territory where current underground equipment should be replaced with overhead due to the fact that those areas are subject to frequent and prolonged flooding resulting in potential safety hazards and damage from water intrusion on underground equipment. This hardening option works for these specific locations based on all the factors for consideration listed above, but it would not work well in other areas of PEF's service territory. This is a real life example of why "one size does not fit all" when it comes to storm hardening.

In areas like Gulf Boulevard and other coastal communities in Pinellas County, local governments have worked with PEF to identify areas where overhead facilities have been or will be placed underground, and this option will help to mitigate storm outages caused by vegetation and flying debris. PEF is also working in these areas to evaluate upgrading portions of those facilities to the surge-resistant design discussed above. Again, these hardening options may work well in these communities, but may not be ideal or desirable in others.

Transmission:

The Transmission Department is employing a system-based approach to changing out wood poles to either concrete or steel poles based upon the inspection cycle and condition of pole. These projects are identified during the transmission pole inspection cycles. Specific new, rebuilt or relocated projects that are planned over the next three years are listed below:

Coastal Transmission Area	Project Type	County	Third Party Impact
TZ-466 to TZ-485 Relocation Wiregrass Ranch	Customer Request	Pasco	Unlikely
Clearwater Village LECW Relocation Project	Governmental	Pinellas	Possible
BZ 69 kV Relocation Pasco County Tommy town North	Governmental	Pasco	Possible
LSP 230kV Relocation Pinellas County #865 Park St/Starkey Road	Governmental	Pinellas	Possible
ANL 230 kV US 19 Pinellas County Relocation	Governmental	Pinellas	Highly Unlikely
ANEC 230 kV US 19 Pinellas County Relocation	Governmental	Pinellas	Highly Unlikely
NC 230 kV Double Circuit US 19 Relocation	Governmental	Pinellas	Highly Unlikely
Higgins – Oldsmar 115 kV line – Rebuild	Rebuild	Pinellas	Highly Unlikely
Oldsmar – Curlew 115 kV line – Rebuild	Rebuild	Pinellas	Highly Unlikely
LTW 69 kV Line – Rebuild	Rebuild	Pinellas	Possible
Hudson – Hudson (WREC) Purchase/Rebuild 115 kV line	Purchase	Pasco	Possible
North East – Fortieth Street 230 kV Rebuild	Rebuild	Pinellas	Possible
New River-Zephyrhills North 115 kV line	New	Pasco	Possible
New River – Loop TZ 69 kV line into New PEF Substation	New	Pasco	Possible
North East – 32nd Street 115 kV line	New	Pinellas	Possible

Southern Transmission Area	Project Type	County	Third Party Impact
ICLB Relocation for Road improvement at CR 545	Governmental	Polk / Osceola	Possible
LV 69 kV Relocation for Orange County Wildwood Area Network	Governmental	Orange	Possible
WR 245 Relocation Walgreen's Entrance Conway Road	Customer Request	Orange	Possible
OSC Relocation for Seaworld	Customer Request	Orange	Possible
WIC Relocation for Seaworld	Customer Request	Orange	Possible
TD-74 thru TD-85 Volusia County Project Rhode Island	Governmental	Volusia	Possible
WCE 340-342.5 for Hartle Grove	Customer Request	Orange	Likely
ICB-69 kV – Poinciana Parkway	Governmental	Polk / Osceola	Possible
ICLW 69kV relo Ernie Caldwell Blvd from CR547 to US17/92 (Possibly completed)	Governmental	Polk	Possible
AH 69 Line Westridge Development Relocation City of Ocoee	Customer Request	Orange	Possible
ILB 230 kV Relocation for Disney	Customer Request	Orange	Unlikely
WR and RW 69 kV Relocation for Lk Underhill and Econ Trail	Governmental	Orange	Possible
WR 69 kV Relocation for City of Orlando Conway Road Widening	Governmental	Orange	Likely
WLL/WLLW Relocation US 27 SR 60 Towerview	Governmental	Polk	Unlikely
WF 69 kV Relocation Rouse Road Orange County	Governmental	Orange	Possible
WR Relocation for Bee Line SR 528 Improvements	Governmental	Orange	Possible

Southern Transmission Area	Project Type	County	Third Party Impact
SLE 69 kV line Relocation for Kennedy Blvd Orange County	Governmental	Orange	Likely
NLA Line Replace wood Poles with Steel Poles	Rebuild	Seminole	Possible
Deleon Springs – Deland West 115 kV Rebuild	Rebuild	Volusia	Possible
AL 69kV rebuild (Indian Lakes Estates Tap)	Rebuild	Polk	Possible
WCE 69 kV (Woodsmere – Ocoee) line Rebuild	Rebuild	Orange	Likely
WCE 69 kV (Clermont East – Montverde) Rebuild	Rebuild	Orange	Likely
AH 69 kV (Avalon – Lake Luntz) Rebuild	Rebuild	Orange	Possible (but unlikely)
WCE 69 kV (Ocoee-Winter Garden) Rebuild	Rebuild	Orange	Likely
WLIC 230 kV Rebuild to Double Circuit	Rebuild / new line	Polk / Osceola	Highly unlikely
ICLB 69 kV Rebuild (Intercession City – Lake Wilson)	Rebuild	Polk / Orange	Possible
ICB 69kV relo for Ronald Regan Parkway from W. of Champions Gate to W. of I-4	Governmental	Polk / Osceola	Likely
ICB 69 kV Rebuild (Intercession City to Barnum City)	Rebuild	Polk / Osceola	Likely
Lake Bryan 230 kV Rebuild Circuit #1 and add circuit #2	Rebuild / new	Orange	Highly unlikely
Avalon to Gifford 230 kV line	New	Orange	Highly unlikely
Clarcona – Crown Point 69 kV line	New	Orange	Likely
AF2 Line Conversion to 230 kV	Rebuild	Polk	Highly unlikely
Lake Placid North 69 kV line	New	Highlands	Possible
Hines – West Lake Wales 230 kV Circuit #1	New	Polk	Highly unlikely
CF Industries 69 kV from Fort Green #11 (Project Complete)	New	Hardee	Highly unlikely

Northern Transmission Area	Project Type	County	Third Party Impact
HB-98 69 kV Croft Avenue Citrus County	Governmental	Citrus	Possible

Northern Transmission Area	Project Type	County	Third Party Impact
CFS 230 kV CR44A and Estes Road Lake County	Governmental	Lake	Unlikely
TQ-23-2 line relocation for Capital Walks Apts	Customer Request	Leon	Possible
TQ 69 kV Line Rebuild (Tallahassee – Oak City)	Rebuild	Leon	Unlikely
FP 69 kV Perry – Smith Tap (FP – 4)	Rebuild	Taylor / Lafayette	Unlikely
FP-69 kV Smith Tap – Lauraville (FP-3)	Rebuild	Lafayette / Suwannee	Unlikely
Silver Springs – Santos Ocala Tap 69 kV	Rebuild	Marion	Possible
Groveland – Camp Lake 69 kV Line Rebuild Circuit #1	Rebuild	Lake	Possible
JS Line for PCS White Springs Tap – Rebuild	Rebuild	Hamilton	Unlikely
Ginne to High Springs 69 kV line – Rebuild	Rebuild	Alachua	Possible
Westwood Acres Tap West Wood Acres (SECO)	New	Marion	Possible
Central Florida – American Cement 230 kV Line	New	Sumter	Unlikely
Bushnell East – Bushnell 69 kV 69 kV lines	New	Sumter	Unlikely
Bushnell East – Bushnell (SECO) 69 kV line	New	Sumter	Possible
Port St. Joe to Apalachicola 69 kV line 2nd circuit	New	Franklin / Gulf	Possible
CSB 115 kV Tap Line to Lecanto (Project Complete)	New	Citrus	No

25-6.0342(4)(c): *The extent to which the electric infrastructure improvements involve joint use facilities on which third-party attachments exist.*

In the description of specific hardening projects above, PEF has provided information as to whether the projects involve joint use facilities on which third-party attachments exist. Also,

on March 2, 2007 and again on April 10, 2007, PEF met with all joint use attachers that have provided PEF contact information pursuant to Rule 25-6.0342(6). In those meetings, PEF provided those attachers with information on where specific hardening projects are taking place. PEF provided detailed written project descriptions and locations those third-party attachers on April 10 and 24, 2007 and has subsequently interacted with any affected joint attacher in an effort to identify any cost or impact to those attachers. Written responses received from third-party attachers are provided herewith in Attachment I.

25-6.0342(4)(d): *An estimate of the costs and benefits to the utility of making the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages.*

With respect to system-wide storm and extreme weather applications identified in Attachment B, PEF has provided any available cost/benefit information within the documents in Attachment B. Additionally, please see the following chart for money that PEF has spent or will spend during 2006 and 2007 on storm hardening and maintenance:

Progress Energy Florida Storm Hardening and Maintenance Costs

Description	2006	2007
Vegetation Management (Distribution & Transmission)	$24,235,263	$24,949,339
Joint Use Pole Inspection Audit	$1,100,000	$470,000
Transmission Pole Inspections	$3,526,899	$2,996,257
Other Transmission Inspections and Maintenance	$12,121,889	$11,502,308
Transmission Hardening Projects	$43,300,000	$38,000,000
Distribution Pole Inspections	$2,300,000	$2,490,000
Distribution Hardening Projects	$10,200,000	$10,610,000
Total	**$96,784,051**	**$91,017,904**

Note: Some 2007 costs contain projected/budgeted figures.

25-6.0342(4)(e): *An estimate of the costs and benefits, obtained pursuant to Rule 25-6.0342(6), to third-party attachers affected by the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages realized by the third-party attachers.*

With respect to system-wide storm and extreme weather applications identified in Attachments A and B, PEF believes that any entity jointly attached to PEF's equipment would enjoy any benefit that PEF would enjoy from that same application, and PEF has provided any available cost/benefit information within the documents in those attachments. With respect to specific information received from joint attachers, please see Attachment I.

25-6.0342(5): *Each utility shall maintain written safety, reliability, pole loading capacity, and engineering standards and procedures for attachments by others.*

Please see Attachments A and J.

25-6.0342(5): *The attachment standards and procedures shall meet or exceed the NESC so as to assure that third-party facilities 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.*

All third-party joint use attachments on Progress Energy Florida's distribution and transmission poles are engineered and designed to meet or exceed current NESC clearance and wind loading standards. New attachment requests are field inspected before and after attachments to assure company construction standards are being met. All entities proposing to attach joint use attachments to Progress Energy Florida's distribution and transmission poles are given a copy of the company-prepared "Joint Use Attachment Guidelines." Attached hereto as Attachment J. These guidelines are a comprehensive collection of information spelling out the company's joint use process, construction standards, timelines, financial responsibilities, and key company contacts responsible for the completing permit requests. All newly proposed joint use attachments are field checked and designed using generally accepted engineering practices to assure the new attachments do not overload the pole or impact safety or reliability of the electric

or other attachments. Additionally, annual and full-system audits are performed as detailed in PEF's annual March 1 comprehensive reliability report. For details on this activity, please see Attachment B.

25-6.0342(6): *Each utility shall seek input from and attempt in good faith to accommodate concerns raised by other entities with existing agreements to share the use of its electric facilities.*

On March 2, 2007 and again on April 10, 2007, PEF met with all joint use attachers that have provided PEF contact information pursuant to Rule 25-6.0342(6). In those meetings, PEF provided those attachers comprehensive and detailed information on PEF's storm hardening plan. PEF provided written project descriptions and locations those third-party attachers on April 10 and April 24, 2007 and has subsequently interacted with any affected joint attacher in an effort to identify any costs, impacts to those attachers, or concerns. Written responses received from third-party attachers are provided herewith in Attachment I. PEF has also answered any questions and addressed any concerns expressed verbally by joint attachers, and PEF has taken all input received into consideration in the development and finalization of its storm hardening plan.

SCANNED

Progress Energy Florida, Inc's Supplement to Storm Hardening Plan

(Docket No. 070298-EI)

Preliminary Analysis

FPSC Staff has identified the following areas in which PEF should provide additional support for its Storm Hardening Plan:

Extreme Wind Load Criteria

- Staff believes substantive support for PEF's 60 mile per hour wind speed loading criteria has not been justified.

PEF's storm hardening plan includes substantial support for the proposition that the EWL standard should not be applied to PEF's distribution poles. The NESC, the very entity that created the EWL standard, found in the 2007 version of the NESC that the EWL standard should not be applied to distribution poles less than 60 feet in height. This information is included as Exhibit C to PEF's plan filed on May 7, 2007. Thus, Staff cannot on the one hand look to the NESC for the EWL wind loading curves for Florida and then ignore the Code's explicit exception for applying those loading curves to distribution poles on the other.

PEF's plan also includes expert testimony before the FPSC showing that the EWL standard would have no appreciable benefit for PEF's distribution poles with respect to preventing wind-caused damage (Exhibits D and E). Additionally, PEF's plan includes official comments to the NESC from utilities around the country, including other coastal utilities and utilities that experience tornados, supporting the fact that the EWL standard has no appreciable wind damage prevention benefit for their distribution poles. (Exhibit F). Also, industry experts representing other industries in this docket, such as those representing the Florida Cable Television Association, have recently provided similar data to Commission Staff in the ongoing workshops in this docket which further supports PEF's position in this regard.

PEF's plan details PEF's experience with pole damage in the 2004 and 2005 hurricane seasons, which confirms, and even documents with pictures, that EWL would not have provided any appreciable benefit for wind damage prevention on distribution poles given the fact that transmission poles built to EWL failed when hit with tornados or microburst winds. (Exhibit G). Also, PEF has provided additional information along with this filing which shows that in 2004, approximately 96% of PEF's pole failures were attributable to flying debris and/or super extreme wind events such as tornados and micro-bursts. See Attachment A hereto. PEF has also provided additional data along with this filing showing that rather than preventing storm outages and costs on PEF's system, the EWL standard would cause longer restoration times and increased restoration costs when compared to PEF's current practice. See Attachments A and B hereto.

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070298-EI **EXHIBIT** 10
COMPANY PEF (Direct)
WITNESS Jason Cutliffe (JC-2T)
DATE 10/02-03/07

In addition to providing detailed support for not using the EWL standard on a system-wide basis within PEF's service territory, PEF's plan also specifically identifies field projects where PEF will test Grade B and EWL construction in contrast with Grade C construction to see if there is any benefit to Grade B and/or EWL in real storm conditions in varying cross sections of PEF's service territory. While wind simulators and other similar devices may provide some limited data, real storms vary in time and intensity and have tornados, flying debris, microburst wind, flooding, erosion, vegetation impacts, and other real world factors that cannot be tested in simulation.

Finally, PEF's policies and procedures state that the NESC is a minimum design standard. As constructed, PEF's facilities have design strengths higher than the 60 mph figure noted by Staff. For example, in urban areas such as Pinellas County and the greater Orlando area, span lengths between PEF's poles are necessarily shorter due to road crossings, density of service points, and other practical design considerations. Therefore, a large percentage of PEF's facilities have design strengths much greater that 60 mph, so it is not accurate to say that PEF is using a pure 60 mile per hour wind loading criteria throughout its system. For detail on this issue, please see Attachment C hereto.

- PEF's Storm Hardening Plan generally refers to its historical field experiences and that PEF has plans to gain more experience. However, PEF does not address any specific efforts to verify or test its proposition that a 60 mile per hour wind speed loading criteria is appropriate for all of its service area.

PEF's plan specifically identifies field projects where PEF will test Grade B and EWL construction in contrast with Grade C construction to see if there is any benefit to Grade B and/or EWL in real storm conditions in varying cross sections of PEF's service territory. While wind simulators and other similar devices may provide some limited data, real storms vary in time and intensity and have tornados, flying debris, microburst wind, flooding, erosion, vegetation impacts, and other real world factors that cannot be tested in simulation. PEF's plan also makes clear that PEF is continuing to take part in collaborative research projects which impact on this issue. Finally, as Commissioner Argenziano recognized at the June 19, 2007 FPSC agenda in this docket, real utility experience in real storms cannot be ignored.[1] PEF knows of no better support for the proposition that its system is and has been properly designed, constructed, and maintained than the real life experience that PEF has had with storms that have taken place within PEF's actual service territory. For example, the 2004 hurricane season shows that 96% of PEF's pole failures were due to flying debris and/or super extreme wind events that would have caused EWL constructed assets to fail. PEF cannot reasonably ignore this sort of

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[1] **Agenda Transcript, Page 13, Lines 3-5**: *"When we talk about trial by experience, I mean, if you are a company that has been in business for a while, you already have experience."*

Agenda Transcript, Page 13, Lines 19-24 & Page 14, Lines 1-2: *"And Madam Chair, what I mean is they have that experience, I'm pretty sure. When you are in business, I would hope that one would want to harden on their own, as much as they could, and then what we are asking them to do in addition to that. But anything that they have come back and said, look, this is what we have done in the past, this works the best, and history shows that maybe what you're asking here may be not as cost-effective as doing it a different way."*

Agenda Transcript, Page 14, Lines 11-14: *"And Madam Chair, I guess that makes a lot of sense. Because if one company has been hit a certain way, and another has been hit a different way, we may be able to use that history from both of them."*

data and advocate charging its customers more money for more expensive construction designs such as EWL that would have also failed and would have been more costly and time consuming to replace in the hurricane restoration phase. See Attachments A and B hereto.

- Thus, our staff is not convinced that PEF's Plan adequately addresses an EWL criteria for PEF's service area. This is of specific concern because adjacent utilities, FPL and TECO, support a minimum extreme wind load criteria of 116 miles per hour in areas where PEF's service area abuts that of the other utility's service area.

PEF first notes that each utility in Florida has differing service territories within different regions of the state, and each utility has different operational experiences and practices within their systems. Also, system storm performance is influenced by the degree to which each utility in Florida has consistently executed sound and prudent maintenance programs and end-of-life equipment replacement. Thus, even with two utilities that closely border each other, one must use care in making utility-to-utility comparisons because in most instances, fair comparisons cannot be made on a true "apples-to-apples" basis.

That being said, PEF's policies and procedures state that the NESC is a minimum design standard. As constructed, PEF's facilities have design strengths higher than the 60 mph figure noted by Staff. For example, in urban areas such as Pinellas County and the greater Orlando area, span lengths between PEF's poles are necessarily shorter due to road crossings, density of service points, and other practical design considerations. Therefore, a large percentage of PEF's facilities have design strengths much greater that 60 mph, so it is not accurate to say that PEF is using a pure 60 mile per hour wind loading criteria throughout its system. In fact, PEF estimates that over 74% of its distribution system meets or exceeds Grade B construction standards. For detail on this issue, please see Attachment C hereto.

Further, as PEF has discussed in detail above, all empirical evidence that PEF has, both nationally and within its own service territory, shows that PEF's design and construction standards are effective and entirely appropriate.

- Additionally, we note that PEF sustained higher damage costs on a per customer basis than either FPL or TECO.

2004 Self-Insured Storm Damage Impact
FPL, PEF, TECO, and Gulf

	Charley (Millions)	Frances (Millions)	Ivan (Millions)	Jeanne (Millions)	Total (Millions)	Millions of Customers	Cost per Customer
FPL	$ 209	$267	$ 0	$234	$ 710	4.4	$161
PEF	$ 146	$129	$ 6	$ 86	$ 367	1.6	$229

TECO	$ 14	$ 23	$ 0	$ 28	$ 65	0.7	$93
GULF	$ 0	$ 0	$ 134	$ 0	$ 134	0.4	$335

Sources: Docket No. 041291-EI for FPL; Docket No. 041272-EI for PEF; and answers to staff data requests for TECO and Gulf.

While there are many factors contributing to the level of storm damage experienced by each of these utilities, PEF's filings do not provide conclusive support for a lower EWL criteria than neighboring utilities which serve in areas that experience equivalent extreme wind speeds.

This comparison is not appropriate. First, the comparison does not take into consideration the intensity of the storms, the length of the storms and paths, as well as other storm-specific considerations. Each storm event affects each utility differently and therefore, it is difficult, if not impossible, to accurately evaluate and compare this sort of data as being indicative of a utility's ability to withstand a storm event.

Using the methodology employed in the comparison above, Gulf Power would have had a $0 cost per customer in 2004 instead of a $335 cost per customer if Hurricane Ivan did not happen. This simple example shows that information such as that presented in the chart above has no relevance as to a utility's ability to withstand storm events because the conclusions drawn from that data will vary and show disparate and inaccurate conclusions depending on a utility's particular storm experience in a given year.

To further illustrate this point, in the recent FPSC Report to the Legislature on Enhancing the Reliability of Florida's Distribution and Transmission Grids During Extreme Weather, the FPSC reported that during the 2005 hurricane season, PEF experienced $7 million in total hurricane damage costs which results in a cost per customer of roughly $4. Thus, by simply using 2005 instead of 2004, PEF's per customer hurricane damage cost goes from $229 to $4.

Mitigation of Flood and Storm Surge Damages to Underground Facilities

- PEF's Plan appears to discourage use of underground in locations at risk for storm surge and flooding. Underground construction is promoted only in areas exposed to minor storm surge and/or short-term water intrusion.

This is not an accurate description of PEF's plan. PEF makes clear in its plan that undergrounding is a site-specific consideration that must be evaluated based on several sets of facts, and that "one size does not fit all" when it comes to undergrounding. PEF specifically identifies 24 underground hardening projects in its storm hardening plan. PEF also specifically describes what measures PEF will use and test to mitigate flood and storm damage to UG facilities on pages 7-8 and 11-14 of its plan, and these measures include strategic storm evaluation prior to placement of UG facilities and targeted use of (1) submersible switchgear and stainless steel transformers; (2) submersible terminations; (3) raised mounting boxes; (4) cold shrink sealing tubes; and (5) submersible secondary blocks.

- While PEF generically discusses the use of its AIS to promote storm hardened underground facilities, PEF failed to state the specific scope and cost of its storm hardening activities.

PEF's plan discusses specific storm hardening activities on pages 14-20. Additionally, please see Attachment D hereto for further information.

Identification of Storm Hardening Activities Resultant Costs and Benefits

- Our staff believes the scope and costs of PEF's storm hardening activities are not clearly stated. PEF's Plan does not identify the incremental storm hardening activities, resultant costs, and benefits that PEF implements through the use of its proprietary project evaluation tool, AIS.

PEF's plan discusses cost benefit information and hardening costs on pages 21-22. Additionally, please see Attachments B and D hereto for further information regarding this issue.

- Instead, PEF's storm hardening activities appear to include all projects and resultant company incurred costs for customer requests, governmental improvements, purchases of other utility facilities, growth spurred conductor upgrades, and new facilities required to address growth.

- ***This statement is not accurate. PEF identifies all of its new hardening projects for distribution on pages 14-15, and all of its new projects for transmission on pages 17-20. PEF also identifies project costs on page 21. This statement is also inaccurate to the extent it suggests that PEF is claiming "normal" work projects as hardening projects. For example, several transmission pole relocations in PEF's plan have been initiated by the DOT or local governments. However, the hardening aspect of these projects is not the relocation but rather is PEF's choice to build the new relocated line with steel or concrete transmission poles. Thus, the comment above focuses on the impetus for the relocation and not the actual resultant hardening project that PEF chose to initiate as part of the relocation.***

- Our staff believes PEF has the skills, expertise, and data to make estimates of potential reduction in storm restoration costs and outages that may occur in response to increases in various storm hardening options. Therefore, our staff believes excluding estimated benefit data and assessment of an EWL criterion does not appear to be reasonable because PEF has the opportunity and the resources to make estimates of reduced storm restoration costs and outages.

- ***As stated in other dockets such as the distribution vegetation management docket and the distribution wood pole inspection docket, PEF cannot reasonably and accurately predict future storm activity and storm impacts, nor can PEF accurately predict how new hardening programs will perform in those storms. This is the major reason that PEF has taken a methodical, scientific approach to potential hardening options through the use of its AIS system and its work with PURC and other utilities. In its***

plan, PEF is testing applications in real storms and is gathering real data so PEF can properly evaluate the efficacy of different hardening options prior to implementing system-wide applications that may or may not provide storm hardening benefits. For additional information on PEF's AIS system, please see Attachment E hereto.

With these caveats stated, please see Attachments A and B hereto.

Cost-Effective Reduction of Storm Damage Costs and Outages

- As noted, PEF is not proposing any changes to its EWL criteria and has not identified substantive increases promoting underground facilities. Nevertheless, PEF's cost estimates, on a per customer basis, of $56 exceed that of FPL ($36-$46) and TECO ($37). Both FPL and TECO are promoting a more robust wind standard than PEF. Therefore, it appears that PEF may be proposing higher cost programs to achieve a less robust electric infrastructure system compared to other utilities.

This statement does not fairly characterize PEF's plan. This statement does not account for the fact that PEF: (1) is hardening all its transmission poles to concrete and steel; (2) is using front-lot construction for new, rebuilt, and relocated distribution assets; (3) has developed and implemented the AIS system to identify, evaluate, and deploy storm hardening techniques; and (4) has identified 36 distribution hardening projects to include OH to UG conversions, submersible UG devices, reconductoring, and alternative NESC applications.

Additionally, this statement assumes, despite all evidence to the contrary, that the EWL provides a hardening benefit when applied to distribution poles in PEF's service territory. As discussed above, all evidence and information that PEF has shows that it does not. The comment above additionally does not account for the fact that PEF is upgrading all of its transmission poles to concrete and steel. This cost constitutes a significant portion of PEF's hardening costs which leads to the $56/per customer figure.

Further, the dollar-per-customer comparison above also does not acknowledge PEF's wood pole inspection plan, vegetation management plan, and 10-point Ongoing Storm Preparedness Plan. The comparison also does not account for other initiatives that PEF has included in its hardening plan such as the AIS system and the 36 distribution hardening projects slated for 2007-2009.

- In general, certain aspects of verifying customer benefits depend on future storm experiences. Nevertheless, it is also possible to test elements of PEF's planned activities through simulated extreme weather events and thereby avoiding complete reliance on a "trial-by-experience" approach. Thus, our staff believes PEF's Plan does not adequately discuss a feed-back mechanism that ensures that the overarching goals of lower storm restoration costs and fewer storm outages are achieved economically.

PEF's plan specifically identifies field projects where PEF will test Grade B and EWL construction in contrast with Grade C construction to see if there is any benefit to Grade B and/or EWL in <u>real storm conditions</u> in varying cross sections of PEF's service territory.

While wind simulators and other similar devices may provide some limited data, real storms vary in time and intensity and have tornados, flying debris, microburst wind, flooding, erosion, vegetation impacts, and other real world factors that cannot be tested in simulation. PEF's plan also makes clear that PEF is continuing to take part in collaborative research projects which impact on this issue. Finally, as Commissioner Argenziano recognized at the June 19, 2007 FPSC agenda in this docket, real utility experience in real storms cannot be ignored.[2] PEF knows of no better support for the proposition that its system is and has been properly designed, constructed, and maintained than the real life experience that PEF has had with storms that have taken place within PEF's actual service territory. For example, the 2004 hurricane season shows that 96% of PEF's pole failures were due to flying debris and/or super extreme wind events that would have caused EWL constructed assets to fail. PEF cannot reasonably ignore this sort of data and advocate charging its customers more money for more expensive construction designs such as EWL that would have also failed and would have been more costly and time consuming to replace in the hurricane restoration phase. See Attachments A and B hereto.

Finally, PEF's 10-Point Storm Preparedness Plan and its subsequent Storm Hardening Plan both discuss how PEF will use its integrated systems and data collection efforts to ensure that the overarching goals of lower storm restoration costs and fewer storm outages are achieved economically. This includes PEF's AIS System, its intergrated GIS systems, its forensic storm analysis process, and other related activity as outlined in those plans.

Details of Storm Hardening Activities

- Like the other utilities, PEF has not explicitly provided all cost components for deploying the Plan. While PEF provided cost estimates of its activities through 2009, PEF failed to separately identify ongoing costs to mitigate flood and storm surge impacts on underground systems and costs for extreme wind criteria.

PEF's plan discusses cost benefit information and hardening costs on pages 21-22. Additionally, please see Attachments B and D hereto for further information regarding this issue.

- Staff believes PEF needs to provide site-specific details for its proposed storm hardening activities. At a minimum, PEF should specifically show the location, scope, and cost of each storm hardening project scheduled for 2007 as well as the criteria for selecting that site for storm hardening.

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[2] **Agenda Transcript, Page 13, Lines 3-5**: *"When we talk about trial by experience, I mean, if you are a company that has been in business for a while, you already have experience."*

Agenda Transcript, Page 13, Lines 19-24 & Page 14, Lines 1-2: *"And Madam Chair, what I mean is they have that experience, I'm pretty sure. When you are in business, I would hope that one would want to harden on their own, as much as they could, and then what we are asking them to do in addition to that. But anything that they have come back and said, look, this is what we have done in the past, this works the best, and history shows that maybe what you're asking here may be not as cost-effective as doing it a different way."*

Agenda Transcript, Page 14, Lines 11-14: *"And Madam Chair, I guess that makes a lot of sense. Because if one company has been hit a certain way, and another has been hit a different way, we may be able to use that history from both of them."*

PEF's plan discusses specific storm hardening activities on pages 14-20. Additionally, please see Attachments B, D, and E hereto for further information.

Consideration of Input from Interested Parties

- PEF solicited and considered input from collocated utilities and third-party attachers. Comments by these affected parties suggests that the 90-day period set by rule may have limited the level of dialog between PEF and affected parties. PEF asserts that dialog with these parties is ongoing. However, the nature of that dialog focuses on aspects of the pole owner/attacher processes, which is not expected to materially impact the scope of PEF's storm hardening activities.

PEF's agrees that the comments it has received from interested parties to date either consist of requests for additional information that are addressed above or deal with issues that do not necessarily deal with PEF's hardening activities. PEF believes that these issues can be resolved with these parties without the need for a hearing.

It is also noteworthy that third party attachers consistently support PEF's position on NESC construction and the unproven nature of EWL, both in written comments and in presentations at workshops.

Operational Expense Differential Between Overhead and Underground Distribution Systems required for Calculation of Contribution-In-Aid-of-Construction (CIAC) pursuant to Rules 25-6.078 and 25-6.115, Florida Administrative Code

- PEF's filed Plan contains no support for assessing the operational expense differential between overhead and underground distribution systems. PEF asserts it has proposed a cost-effective plan. Thus, our staff believes PEF has the information necessary to determine the operational expense differential between PEF's overhead and underground systems.

PEF is not aware of any section in Rule 25-6.0342 that requires such information to be provided with PEF's Storm Hardening Plan. Additionally, PEF has provided information to the Commission regarding CIAC issues in separate CIAC dockets which the Commission has issued orders in.

Definition of Critical Infrastructure and Major Thoroughfares

Critical Infrastructure

Critical infrastructure is defined as infrastructure that is vital to the community's welfare. Examples include 911 Call Centers, Emergency Operations Centers (EOC), fire and police services, hospitals, emergency shelters, sewage pumping stations, schools, and gas stations.

Major Thoroughfares

Major thoroughfares are defined as major transportation arteries (such as interstate highways, major state highways and significant local roads) that are vital to first responder movement, the delivery of critical resources to communities, and evacuation.

Attachment A

2004 Hurricane Season Extreme Wind Example

Number of Poles Replaced in 2004 (4 storms)	85% Poles Replaced for Flying Debris and Trees	11 % Poles Replaced for Tornado and Mircoburst	4% Poles Replaced for Hurricane Wind Effect
7,151	6,079	804	268

During 2004 Hurricane Season

Number of Poles Replaced	Replacement Cost per Pole	Total Replacement Cost
7,151	$1,803	$12,893,253

Extreme Wind Cost

Number poles for EW vs. Grade C per Spec Book 02.02-03

For 3 phase 795 AAC Line	Class Pole for 45'	Span Length	Poles per Mile Circuit	Comments
Grade C	C4	250	21.12	795 Single Circuit with JU
EW (150 MPH)	H2	150	35.20	795 Single Circuit with JU

Number of Poles Factor to EW (150 MPH)	1.67

Poles Replaced if Built to EW	Replacement Cost per Pole	Total Replacement Cost	Incremental Cost
11,494	$2,116	$24,321,304	$11,428,051

Estimate Increase in Restoration Time if Built to Extreme Wind

Increase in Poles if Built to EW	Average Manhours to Replace Pole	Total Increment Manhours
4,343	11.5	49,945

Estimate Increase in Restoration Days if Built to Extreme Wind

Number of Men	Hours Worked per Day	Manhours per Day	Increase in Restoration Days
6,337	10	63,370	0.8

ATTACHMENT A

Attachment B

Docket No. 070298-EI
PEF's Plan Supplement
Exhibit No. ___ (JC-2T)
Page 13 of 46

PEF's Storm Hardening Plan Cost Matrix
Rule 25-6.0342, F.A.C.
(Dollars in Millions)

KEY
N/A = Not Applicable
U = Unknown
UA = Unavailable

	Activity	Docket No	Actual/Estimated Utility Costs						Estimated Benefits to Utility Customers						Other Estimated Company Benefits			Estimated Benefits to Third Party Attachers					
									Impact on Storm Restoration Costs			Impact on Storm Caused Outages						Impact on Storm Restoration Costs			Impact on Storm Caused Outages		
			2004	2005	2006	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
(a)	**Wooden Pole Inspections.**	060078-EI	$0.351	$0.155	$2.300	$2.490	$2.490	$2.490	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Ten Storm Hardening Initiatives.	060198-EI																						
(b)	1 A Three-Year Vegetation Management Cycle for Distribution Circuits	060198-EI	N/A	N/A	$19.549	$19.549	$21.046	$21.046	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
(c)	2 An Audit of Joint-Use Attachment Agreements	060198-EI	UA	$0.870	$1.200	$0.430	$0.443	$0.456	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
(d)	3 A Six-Year Transmission Structure Inspection Program	060198-EI	N/A	N/A	$3.527	$2.996	$3.071	$3.148	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
(e)	4 Hardening of Existing Transmission Structures	060198-EI	N/A	N/A	$43.300	$38.000	$45.000	$45.000	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
(f)	5 Transmission and Distribution GIS	060198-EI	N/A	N/A	N/A	$0.200	UA	UA	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
(g)	6 Post-Storm Data Collection and Forensic Analysis	060198-EI	C	C	C	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
(h)	7 Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems	060198-EI	C	C	C	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
(i)	8 Increased Utility Coordination with Local Governments	060198-EI	N/A	N/A	C	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
(j)	9 Collaborative Research on Effects of Hurricane Winds and Storm Surge	060198-EI	N/A	N/A	$0.005	$0.073	$0.073	$0.073	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
(k)	10 A Natural Disaster Preparedness and Recovery Program	060198-EI	N/A	$0.065	$0.075	$0.090	$0.095	$0.095	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	Compliance with National Electric Safety Code's adoption of Extreme Wind Loading Standards.	070298-EI																						
(l)	1 New Distribution Facilities	070298-EI	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
(m)	2 Major planned expansion, rebuild, or relocation of distribution facilities	070298-EI	$0.000	$0.000	$0.000	$0.600	$1.000	$1.000	($0.032)	($0.023)	($0.093)	(173 Manhours)	(127 Manhours)	(506 Manhours)	N/A	N/A	N/A	U	U	U	U	U	U
(n)	3 Critical infrastructure and major thoroughfares	070298-EI	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
	Mitigating flood and storm surge damage to underground and supporting overhead facilities.	070298-EI																						
(o)	1 Transmission	070298-EI	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(p)	2 Distribution	070298-EI	N/A	N/A	N/A	$0.430	$0.250	$0.500	$0.017	$0.004	$0.038	27 Manhours	7 Manhours	60 Manhours	N/A	N/A	N/A	U	U	U	U	U	U
(q)	**Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance.**	070298-EI	N/A	N/A	N/A	$0.170	$0.400	$0.347	$0.009	$0.008	$0.031	103 Manhours	88 Manhours	352 Manhours	N/A	N/A	N/A	U	U	U	U	U	U
	Other Distribution Hardeneding Activities																							
	Small Wire Reconductor	070298-EI	UA	UA	$1.100	$2.100	$2.100	$2.000	$0.017	$0.015	$0.029	211 Manhours	92 Manhours	356 Manhours	N/A	N/A	N/A	U	U	U	U	U	U
	OH to UG Conversions	070298-EI	UA	UA	UA	$0.900	$0.725	$0.900	$0.001	$0.001	$0.003	16 Manhours	8 Manhours	12 Manhours	N/A	N/A	N/A	U	U	U	U	U	U
	Midfeeder Electronic Sectionalizing	070298-EI	UA	UA	$0.600	UA	UA	UA	D	D	D	D	D	D	N/A	N/A	N/A	U	U	U	U	U	U
	Wood Pole Replacements	070298-EI	UA	UA	$3.500	$2.480	$2.500	$2.500	D	D	D	D	D	D	N/A	N/A	N/A	U	U	U	U	U	U
	Padmount Transformer Inspections	070298-EI	UA	UA	$0.600	$1.095	UA	UA	D	D	D	D	D	D	N/A	N/A	N/A	U	U	U	U	U	U
	Padmount Transformer Replacements	070298-EI	UA	UA	$4.400	$2.190	$2.200	$2.200	D	D	D	D	D	D	N/A	N/A	N/A	U	U	U	U	U	U
	AIS Model (Davies Consulting)	070298-EI	N/A	N/A	N/A	$0.040	UA	UA	D	D	D	D	D	D	N/A	N/A	N/A	U	U	U	U	U	U
	Network Maintenance	070298-EI	UA	UA	UA	$1.700	$1.700	$1.700	D	D	D	D	D	D	N/A	N/A	N/A	U	U	U	U	U	U
	TOTALS																							

- PEF Transmission uses either steel or concrete poles in new construction, rebuilds or replacements. New construction and relocations are designed to the NESC Extreme Wind Standard. Steel and concrete transmission poles are approximately 15% stronger than wood. These poles also are more homogeneous and have more reserve strength than wood. Steel and concrete does not deteriorate at the same rate as wood nor are they subject to insects or woodpecker damage. These factors logically will have benefits for both restoration costs and outage avoidance, but PEF cannot accurately estimate and quantify those benefits in the manner requested.

A These issues are addressed in Docket No. 060078-EI (Wood Pole Inspection Plan)

B These issues are addressed in Docket No. 060198-EI (EIW Storm Preparedness Plan).

C Money spent in these categories comes from different budget sources and delineated spending for these sub-categories is not available at this time.

D These replacement, inspection and maintenance activities logically will have benefits for both restoration costs and outage avoidance, but PEF cannot accurately estimate and quantify these benefits in the manner requested

Lines M, P and Q - Please see "Attachment A" for narrative explanation.

ATTACHMENT B

Methodology for Storm Restoration Benefits Forecast

A forecast model for hurricane type activity was used for the AIS projects of EWL, Submersible UG facilities, Small Wire Reconductor, Back lot to Front lot conversions and OH to UG conversions. The 2004 hurricane season was a high year of activity for PEF. That year was used as a base year to forecast the storm activity through 2014. Three storm levels were used: High, Medium and Low. The medium level was 50% of the high level while the low level was 25% of the high level. The assumption was that the High storm level would occur every 5 years. The medium year was also assumed to occur every 5 years. Below is the forecast of storm levels for 2004-2014:

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
High	Low	Low	Medium	Low	High	Low	Low	Medium	Low	High

This forecast was used to estimate the potential benefits to PEF for each of the Hardening activities. The storm level was applied to the units of each hardening activity for the years 2007 - 2009. Cost and man hour benefits reflect either fewer units to repair or shorter time to repair damage units.

The following addresses assumptions for each hardening activity in PEF's cost benefit matrix:

EWL

To build to EWL the average span lengths will need to be decreased and therefore more poles will be used. The poles used are larger and will be designed and built to different standards. The incremental increased cost to replace EWL poles and the incremental increased restoration times were used to estimate negative effects of EWL on PEF's system.

Submersible Facilities

The assumption of benefits is that fewer padmount transformers and switchgear would fail and/or be replaced where targeted submersible facilities are used.

Small Wire Reconductor

The assumption of benefits is that fewer spans would fail and/or be replaced due to trees and other debris based on the increased mechanical strength of the larger wire.

Back Lot to Front Lot Conversions

The assumption of benefits is that it will generally take less time and money to repair a span down in area that is easily accessible then in the back lot or inaccessible area.

OH to UG Conversions

The assumption of benefits is that fewer overhead spans of wire will be down or fail due to debris and vegetation impact since converted facilities will be underground.

Attachment C

Progress Energy Florida
System Construction Grade Analysis

For efficiency in purchasing, handling, and project logistics, Progress Energy Florida ("PEF") has standardized poles stocked for its standard types of field construction. It is not cost effective nor is it operationally effective to stock multiple types of poles from different pole classes, so PEF has narrowed the types of poles in its inventory to the lowest number practically possible. The poles that PEF keeps in its inventory are suitable to meet Grade C construction in all cases, but oftentimes, these poles result in facilities meeting Grade B standards or above for certain types of construction.

The standard poles stocked in PEF's inventory include the following:

30 foot class 6
35 foot class 5
40 foot class 5
45 foot class 4
45 foot class 2
50 foot class 3

The class of the pole is relative to its strength as defined by ANSI 05.1. Poles with lower class numbers are stronger than ones with higher class numbers. For example, a 40 foot class 4 pole is stronger than a 40 foot class 5. A 50 foot class 3 pole is stronger than a 40 foot class 4 poles.

Each of the poles listed above have a maximum bending moment, and the amount and size of equipment on the pole determines how "loaded" the pole is. Depending on the load applied to a pole, a particular line of poles may meet Grade B construction or better. In all cases, however, PEF's designs meet or exceed Grade C construction.

For lighting and secondary voltage applications, 30 foot class 6 poles are used. For single phase lines with no joint users (telephone or CATV) 35 foot class 5 poles are used. For single phase lines with joint users, 40 foot class 5 poles are used. 45 foot class 4, 45 foot class 2 and 50 foot class 3 poles are used for three phase lines. The pole is selected based on height requirements and whether joint users exist on the pole line in question.

Analysis indicates that for most lines designed on PEF's system, Grade B construction is achieved. This is because a standard pole from PEF's inventory is used as opposed to a lower class pole that could be used to meet Grade C construction. Lighting poles, secondary voltage poles, single and two phase primary voltage poles typically meet Grade B construction because the "loading" on the pole is not too great for the standard class pole being used.

The relationship between strength, expressed in pounds per square foot, and wind speed expressed in mile per hour is as follows:

ATTACHMENT C

$\sqrt{\frac{Load}{0.00256}} = Windspeed$ For round object such as poles and wires.

The NESC zone load for Florida is 9 lbs/sqft. Taking into consideration the applied overload factors (OLF) and strength factors (SF) for wood, and assuming that a given pole meets the average strength requirements of ANSI 05.1, one can use the above formula to equate the strength of a pole in to a wind speed.

$$\sqrt{\frac{Load \times OLF \div SF}{0.00256}} = Windspeed$$

For Grade B $\sqrt{\frac{9 \times 2.5 \div 0.65}{0.00256}} = 116$ mph and for Grade C $\sqrt{\frac{9 \times 1.75 \div 0.85}{0.00256}} = 85$ mph

These equations assume a fully loaded pole. Due to standardization of pole sizes, however, PEF's poles are rarely fully loaded. PEF's typical 3 phase pole is a 45' class 4, supporting 795 AAC primary and 1/0 AAAC neutral in maximum 250' spans. There will also typically be a transformer and a communication conductor attachment on a pole. Assuming a 100 kVA transformer and a 1" diameter communication conductor will result in this typical pole being loaded to 84% at Grade C. Equating this to a wind speed:

$$\sqrt{\frac{9 \times 1.75 \div 0.85 \div 0.84}{0.00256}} = 93\,\text{mph}$$

A typical 2 phase line consists of 1/0 AAAC primary and neutral with maximum 250' spans on a 45' class 4 pole. Assuming there is also a 100kVA transformer and a 1" communication conductor will result in the pole loaded to 51% at Grade C. Equating this to a wind speed:

$$\sqrt{\frac{9 \times 1.75 \div 0.85 \div 0.51}{0.00256}} = 119\,\text{mph}$$

A typical single phase line consists of 1/0 AAAC primary and neutral with maximum 250' spans on a 40' class 5 pole. Assuming a 50kVA transformer and a 1" communication conductor will result in the pole being loaded to 52%. Equating this to a wind speed:

$$\sqrt{\frac{9 \times 1.75 \div 0.85 \div 0.52}{0.00256}} = 118\,\text{mph}$$

And finally, a typical 30' class 6 service lift pole supporting a 100' span of 1/0 Al triplex and 50' Al triplex service drop at 90 degrees will result in the pole loaded to 70% at Grade C. Equating this to a wind speed:

$$\sqrt{\frac{9 \times 1.75 \div 0.85 \div 0.70}{0.00256}} = 102 \text{ mph}$$

One can see that the strength of a typical PEF pole significantly exceeds the requirements of Grade C and often exceeds the requirements of Grade B.

Primary construction on the PEF distribution system breaks down as follows:

Type Construction	% System	Miles
1 phase	66.0%	12,066
2 phase	8.2%	1,499
3 phase	25.8%	4,717

Therefore, based on typical construction applications using standard poles, approximately 74.2% of primary distribution plant meets or exceeds the requirements of Grade B when installed.

Attachment D

Project Name	Const. Due Date	Hardening Activity	Beginning Pole #	Middle Pole #	End Pole #	Joint Users	Est. Proj. Length	County
In Construction								
Coquina Key	August	Small Reconductor	49208	48648	B202513	*Beginning Pole* 1) Bright House Networks 2) Knology *Middle Pole* 1) Bright House Networks 2) Knology *End Pole* 1) Bright House Networks 2) Knology	5.68 miles	Pinellas
SR-408 @ Woodbury Rd	September	OH – 2 UG Conversion	6593065	NA	840855	*Beginning Pole* 1) Bright House Networks 2) Comcast 3) BellSouth *Middle Pole* 1) Bright House Networks 2) Comcast 3) BellSouth *End Pole* 1) Bright House Networks 2) Comcast 3) BellSouth	383 feet	Orange
St George Is – Plantation	August	Submersible UG	NA	NA	NA	NA	NA	Franklin
US 98 – Brooksville	August	Small Reconductor	B163198	465249	420798	*Beginning Pole* 1) BellSouth *Middle Pole* 1) BellSouth *End Pole* 1) BellSouth	2 miles	Hernando
In Permitting / Easements								
Calle De Sol	October	OH – 2 UG Conversion	792636	792644	810069	*Beginning Pole* 1) BellSouth *Middle Pole* 1) BellSouth *End Pole* 1) BellSouth	.82 miles	Orange

ATTACHMENT D

US 441 west of Hwy 19	September	OH – 2 UG Conversion	6937131	NA	A91068	*Beginning Pole* 1) NONE *Middle Pole* 1) NONE *End Pole* 1) NONE	400 feet	Lake
OH Crossing of Turnpike (K1025 @ K1025 & K1028 @ K128)	September	OH – 2 UG Conversion	*Ckt #1* A39478 *Ckt #2* 783152	NA	A16211 783153	*Beginning Pole* 1) Bright House Networks *Middle Pole* 1) Bright House Networks *End Pole* 1) Bright House Networks	470 feet	Orange
OH Cross of Trnpke 2 (K1780 @ K6434991 and K1775 @ K5021)	September	OH – 2 UG Conversion	*Ckt #1* 5388156 *Ckt #2* 5380611	NA	5388145 5380647	*Beginning Pole* 1) NONE *Middle Pole* 1) NONE *End Pole* 1) NONE	700 feet	Orange
In Design								
A192 – Luraville	September	Small Reconductor	B261888	46845	4015271	*Beginning Pole* 1) NONE *Middle Pole* 1) NONE *End Pole* 1) NONE	2 miles	Suwannee
Feeder X220	September	Extreme Wind Upgrade	4938164	120167	127818	*Beginning Pole* 1) Bright House Networks 2) Knology *Middle Pole* 1) Bright House Networks 2) Knology *End Pole* 1) Bright House Networks 2) Knology	1.5 miles	Pinellas
R448 – Dunnellon	October	Back lot – 2-Front Lot Conversion	B162834	466752	467177	*Beginning Pole* 1) NONE *Middle Pole* 1) NONE *End Pole* 1) NONE	1.5 miles	Marion

In the Queue								
OH Crossing of Turnpike (K68@K5255)	October	OH – 2 UG Conversion	B65162	NA	B65164	*Beginning Pole* 1) NONE *Middle Pole* 1) NONE *End Pole* 1) NONE	450 feet	Orange
US 301 – Citra	December	Small Reconductor	6042333	37G951 R	B170985	*Beginning Pole* 1) NONE *Middle Pole* 1) NONE *End Pole* 1) NONE	1 mile	Marion
OH Crossing of Turnpike (K1780 @K2379)	November	OH – 2 UG Conversion	5380854 *Equip-ID – Trans Pole*	NA	5380855 *Equip-ID – Trans Pole*	*Beginning Pole* 1) NONE *Middle Pole* 1) NONE *End Pole* 1) NONE	420 feet	Orange
2008								
Florida Turnpike @ Sandlake Rd (485')	November	OH – 2 UG Conversion	B229341	NA	B229340	*Beginning Pole* 1) FPL FiberNet 2) Orange County 3) Bright House Networks 4) BellSouth *Middle Pole* 1) FPL FiberNet 2) Orange County 3) Bright House Networks 4) BellSouth *End Pole* 1) FPL FiberNet 2) Orange County 3) Bright House Networks 4) BellSouth	485 feet	Orange
Winderlakes	October	OH – 2 UG Conversion	82696	82689	803936	*Beginning Pole* 1) Bright House Networks *Middle Pole* 1) NONE *End Pole* 1) Pole not in field	1 mile	Orange

Florida Turnpike @ Sandlake Rd (746')	October	OH – 2 UG Conversion	718318	NA	765231	*Beginning Pole* 1) FPL FiberNet 2) Orange County 3) Bright House Networks 4) BellSouth *Middle Pole* *End Pole* 1) FPL FiberNet 2) Orange County 3) Bright House Networks 4) BellSouth	746 feet	Orange

JOINT ATTACHER COST IMPACTS

OH to UG Conversions

If a joint attacher relocates its facilities underground with PEF, the joint attacher would incur costs associated with relocating and undergrounding its facilities.

Small Wire Reconductor

Since these projects should not involve changing or relocating poles, the cost impacts to joint attachers should be $0.

Extreme Wind Pilot Projects

If a joint attacher relocates its facilities to an extreme wind pilot pole with PEF, the joint attacher would incur costs associated with relocating its facilities.

Submersible Underground

These projects should have a $0 cost impact on joint attachers.

Rear to Front Lot Relocations

If a joint attacher relocates its facilities to front lot with PEF, the joint attacher would incur costs associated with relocating its facilities.

PEF Region	PEF OpCenter	Fla County	Project Name	Project Type	Estimated Cost
South Central	Buena Vista	Orange	Calle De Sol	OH to UG Conversion	$544,472.35
North Coastal	Monticello	Franklin	St Geroge Is - Plantation	Submersible UG	$485,621.00
North Central	Jamestown	Orange	SR-408 @ Woodbury Rd	OH to UG Conversion	$28,725.00
South Central	Buena Vista	Orange	Winderlakes	OH to UG Conversion	$159,296.00
North Coastal	Inverness	Marion	R448 - Dunnellon	Back lot to Front lot conversion	$175,000.00
North Coastal	Inverness	Hernando	US 98 - Brooksville	Small Reconductor	$240,000.00
North Central	Apopka	Lake	US 441 west of Hwy 19	OH to UG Conversion	$42,750.00
South Coastal	St Petersburg	Pinellas	Coquina Key	Small Reconductor	$1,372,000.00
South Central	SE Orlando	Orange	Florida Turnpike @ Sandlake Rd (746')	OH to UG Conversion	$55,950.00
South Central	Buena Vista	Orange	OH Crossing of Turnpike (K68 @K5255)	OH to UG Conversion	$41,000.00
North Coastal	Monticello	Suwannee	A192 - Luraville	Small Reconductor	$300,000.00
South Coastal	Clearwater	Pinellas	Indigo	Small Reconductor	$129,500.00
South Central	SE Orlando	Orange	OH Cross of Trnpke 2 (K1780 @ K6434991 and K1775 @ K5021)	OH to UG Conversion	$82,302.00
South Central	SE Orlando	Orange	Florida Turnpike @ Sandlake Rd (485')	OH to UG Conversion	$36,375.00
South Central	SE Orlando	Orange	OH Crossing of Turnpike (K1780 @K2379)	OH to UG Conversion	$39,000.00
North Coastal	Ocala	Marion	US 301 - Citra	Small Reconductor	$100,000.00
South Coastal	St Petersburg	Pinellas	Feeder X220	Extreme Wind Upgrades	$662,400.00
South Central	SE Orlando	Orange	OH Crossing of Turnpike (K1025 @ K1025 & K1028 @ K128)	OH to UG Conversion	$68,199.62
North Central	SE Orlando	Orange	Sprint Earth Station & Cocoa Water Wells	Small Reconductor	$794,784.00
North Central	Longwood	Seminole	I-4 @ SR-436	OH to UG Conversion	$172,650.00
South Central	SE Orlando	Orange	Florida Turnpike @ Orange Blossom Trail	OH to UG Conversion	$13,650.00
South Coastal	Seven Springs	Pasco	Floramar Subdivision	Submersible UG	$150,000.00
South Central	SE Orlando	Orange	Hoffner Ave and feeder Tie	Small Reconductor	$194,662.00
North Central	Longwood	Orange	I-4 @ Oranole Road/Lake Destiny Dr	OH to UG Conversion	$26,025.00
South Central	SE Orlando	Orange	Holden Ave E) Orange Blossom Trail	Small Reconductor	$182,000.00
North Coastal	Inverness	Citrus	Homosassa - Riverhaven	Submersible UG	$100,000.00
North Central	Longwood	Seminole	I-4 @ EE-Williamson Rd	OH to UG Conversion	$33,675.00
North Central	Longwood	Seminole	I-4 @ SR-434	OH to UG Conversion	$40,575.00
North Central	Eustis	Orange	I-4 @ Lee Rd	OH to UG Conversion	$49,800.00
North Central	Longwood	Orange	I-4 @ Kennedy Blvd	OH to UG Conversion	$17,700.00
South Central	Lake Wales	Polk	Highland Park	Small Reconductor	$110,450.00
South Central	Lake Wales	Polk	Hibiscus Feeder Tie	Small Reconductor	$353,920.00
North Central	Longwood	Seminole	I-4 @ North St	OH to UG Conversion	$32,250.00
North Central	Longwood	Orange	I-4 @ Fairbanks Ave	OH to UG Conversion	$53,550.00
North Central	Longwood	Seminole	I-4 @ Orange St	OH to UG Conversion	$25,950.00
North Central	Longwood	Seminole	Us 17/92 & SR-436	OH to UG Conversion	$53,475.00

Attachment E

Florida Public Service Commission (PSC)

Asset Investment Strategy (AIS) Model

Summary Report

Prepared by

Progress Energy Florida (PEF)

Work Performed
January – March 2007

Report Date:
July 30, 2007

Progress Energy

ATTACHMENT E

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Davies Consulting – AIS Background

The Asset Investment Strategy (AIS) is a comprehensive process and web-enabled decision support tool developed by Davies Consulting, Inc. AIS has been used to optimize capital investments and O&M projects within and across business units including: Electric Distribution, Transmission, Power Supply, Customer Care, Gas, Water, and Business Services (e.g., IT, HR, Fleet, and Facilities). Currently in use by nearly twenty U.S. and Canadian utilities, AIS integrates process, people and technology to optimize spending. Refer to Exhibit A for a more detailed description of this product.

PEF Approach

The approach used to complete this task focused on learning from past analysis and leveraging readily available information to prioritize projects.

1. *Developed the evaluation template* – Workshops were held to identify key strategic indicators of project merit and attributes that describe the value for each criterion. The team also defined the initial set of questions and answers as well as weights and values that were used to prioritize projects.

2. *Identified hardening projects* – PEF staff worked to determine a set of discrete hardening projects that would produce a diverse portfolio reaching all sections of PEF power delivery systems (e.g., relocations, upgrades, OH to UG conversions, etc.) The final set of projects included 38 projects that break down as follows:

Sub-Categories	Description	Number of Projects
OH to UG conversions	Placing existing overhead (OH) electric lines and facilities underground (UG) via the use of specialized UG equipment and materials. The primary purpose of this hardening activity is to attempt to eliminate tree and debris related outages in the area of exposure. When applied to crossings on major highways, this hardening activity can also mitigate potential interference with first responders and other emergency response personnel caused by fallen lines.	21
Small Wire Upgrade	The upgrade of an existing overhead line currently with either #4 or #6 conductor to a thicker gauge conductor of 1/0 or greater. The primary purpose of this hardening activity is to attempt to utilize stronger conductor that may be better able to resist breakage from falling tree branches and debris.	10

Back lot to Front lot conversion	Relocation of an existing overhead line located in the rear of a customer's property to the front of the customers property. This involves the removal of the existing line in the rear of the property and construction of a new line in the front of the property along with re-routing service drops to individual customer meters. The primary purpose of this hardening activity is to minimize the number of tree exposures to the line to prevent outages and to expedite the restoration process by allowing faster access in the event an outage occurs.	1
Submersible UG	Installing PEF flood resistant equipment to existing UG line and equipment to better withstand a storm surge. This involves the use of specialized stainless steel equipment and submersible connections. The primary purpose of this hardening activity is to attempt to minimize the damage caused by a storm surge to the equipment and thus expedite the restoration after the storm surge has receded.	3
Alternative to NESC Construction Standards	Building OH line and equipment segments to grade B construction or the extreme wind standard as shown in the NESC extreme wind contour lines of figure 250-2(d). This will be done via the use of the current PEF grade B and extreme wind standards which call for the use of the industry accepted Pole Foreman program to calculate the necessary changes. Typical changes include shorter span lengths and higher class (stronger poles). The primary purpose of this hardening activity is to attempt to reduce the damage caused by elevated winds during a major storm. Locations have been chosen to provide contrasting performance data between open costal and inland heavily treed environments.	1

3. *Loaded projects into AIS and agreed to priorities* – DCI worked with the PEF staff to enter all of the projects that needed to be analyzed into AIS, utilizing the template that was developed in the previous step. The objective here was to ensure completeness and consistency in the evaluation of these alternatives. The team met to review the template and make any adjustments to ensure consistency and relevance of all questions in the template based on the various "what-if" scenarios. The team also evaluated the rankings and agreed on the final set of projects to be funded for 2007 work. Selection criteria was chosen to create a structure that best represents the most important factors, regardless of current data accuracy or precision. It is expected that weighting and data measurements will be adjusted over time based on feedback and experience.

Evaluation Template Overview

Key strategic criteria include:

Strategic Criteria	Description	Weighting
Financial Cost	Provides the financial value of the proposed project based on Net Present Value (NPV) of total costs associated with the project (Capital and O&M) and associated potential benefits such as avoided O&M costs, avoided outages, etc.	20%
Major Storm Impact	Determines the potential benefits that the project provides during a major storm based on reduced damages or the ability to restore power more rapidly.	35%
Community Storm Impact	Evaluates the potential benefits that the proposed project will have on a community's ability to cope with damage.	10%
Third Party Impact	Captures complexities of proposed projects in terms of coordination with third parties such as telecommunication, Cable TV, permitting, costs, etc.	5%
Overall Reliability	Captures the overall potential reliability benefits that the project provides on an on-going basis in terms of reduced customer interruptions and outage duration.	30%

Required basic project information includes:

- **Project Name** - Enter a unique identifier for the proposed hardening project
- **Brief Description of Project** - Include scope of work, distance, and starting and ending device numbers
- **Project Sponsor** - Name of person requesting hardening project
- **Operating Unit** - PEF distribution region project resides in
- **Project Type** - Proposed hardening solution to be implemented

Each strategic criterion is evaluated based on the answers to a set of specific questions. Exhibit B is a detailed overview of the questions within each strategic criterion, including the description of the assumptions and available answers for each question.

Data Collection Method and Assumptions by Question

In order to ensure consistency in the responses to specific questions for each project, the team agreed on specific sources of information and created common assumptions which are described in the tables below by each question.

Major Storm Outage Reduction Impact – 35%

<table>
<tr><th>Template Question</th><th colspan="2">Data Collection Method</th></tr>
<tr><td>At the end of this project, what percent of the exposure will be hardened?</td><td colspan="2">This question attempts to assign priority based on the total completion of hardening activities around a particular geographical boundary.

If a project has certain completion significance that percentage is indicated. For example if project calls for the relocation of the final remaining back lot line in a neighborhood, 100% would be entered as the value in this question since at the end of the project, this neighborhood will be considered completely hardened.</td></tr>
<tr><td>How many customers are served from this device?</td><td colspan="2">This question attempts to assign priority based on the number of customers served downstream of the upstream protecting device of the proposed hardening section.

Protecting devices include Fuses, Sectionalizers, Reclosers, and Breakers.</td></tr>
<tr><td>What will be the impact of this project on the restoration time during major storm?</td><td colspan="2">This question attempts to assign priority based on the potential impact of reducing restoration time if a major storm were to occur.

The possible values for this question are based on the type of proposed hardening activity:</td></tr>
<tr><td></td><td>OH-to-UG Conversion</td><td>Significant Reduction</td></tr>
<tr><td></td><td>Backlot-to-Frontlot Relocation</td><td>Moderate Reduction</td></tr>
<tr><td></td><td>Small Wire Upgrades</td><td>Moderate Reduction</td></tr>
<tr><td></td><td>All Others</td><td>Minimal Reduction</td></tr>
</table>

<table>
<tr><th>Template Question</th><th>Data Collection Method</th></tr>
<tr><td>What is the annual probability of wind over 70 mph in the area served by this device?</td><td>This question attempts to assign priority based on the probability of winds exceeding 70mph striking the project area.

The probability is determined utilizing data from the Federal Emergency Management Agency's (FEMA) multi-hazard risk assessment and loss estimation software package. FEMA's HAZUS® MH software package is used for Earthquake, Wind, & Flood damage estimation.

The HAZUS® MH program categorizes this probability by census track for all of the United States. PEF extracted pertinent information for the state of Florida from the software and assumed that the entire service territory would see 30 mph winds on an annual basis to build the probability table. PEF then used existing utility software to determine the geographical location of the proposed hardening project in terms of its census track and matched it against the HAZUS® MH tables to determine what the probability of winds exceeding 70 mph would be.</td></tr>
<tr><td>At what level of hurricane will the area served by this feeder flood due to storm surges?</td><td>This question attempts to assign priority based on the project area's exposure to flooding from a tropical storm or hurricane.

The flood level boundaries were obtained from the Division of Emergency Management at the Department of Community Affairs of Florida. These boundaries, used in conjunction with internal software, were used by PEF to geographically plot the proposed hardening projects against the flood zones and determine the level of flooding.</td></tr>
<tr><td>What is the tree density in the area served by this device?</td><td>This question attempts to assign priority based on the project area's exposure to trees. Increased tree density around overhead distribution lines results in increased outages.

Utilizing the project sponsor's knowledge of the proposed hardening project, the approximate tree density around the project is determined.</td></tr>
<tr><td>What level of tree damage will this project mitigate during a major storm?</td><td>This question attempts to assign priority based on the potential of reducing restoration time if a major storm were to occur.

The possible values for this question are based on the type of proposed hardening activity:

<table><tr><td>OH-to-UG Conversion</td><td>Significant Reduction</td></tr><tr><td>Backlot-to-Frontlot Relocation</td><td>Small Reduction</td></tr><tr><td>Small Wire Upgrades</td><td>Small Reduction</td></tr><tr><td>All Others</td><td>None</td></tr></table></td></tr>
</table>

Community Storm Impact – 10%

<table>
<tr><th>Template Question</th><th>Data Collection Method</th></tr>
<tr><td>How many critical customers does this project address?</td><td>This question attempts to assign priority based on the potential number critical customers that will be positively impacted by the proposed project. Creates a placeholder for potential consideration of critical infrastructure.

The Critical Customer list is created and maintained by our Commercial Industrial Governmental (CIG) group and includes a list of customer accounts for shelters, public works buildings, police / fire stations, street signals, and others.

All accounts are classified by the CIG group in four categories. Priority 1 is the most critical and includes accounts such as shelters & hospitals.</td></tr>
<tr><td>How many priority 1 critical customers does this project address?</td><td>This question attempts to assign priority based on the potential number of priority 1 critical customers that will be positively impacted by the proposed project.

This questioned is answered utilizing the same list mentioned above created by the CIG group. Of those projects which contained critical customers as dictated by the list, the amount of those accounts which have been further classified by the CIG group as a priority 1 account are identified.</td></tr>
<tr><td>How valuable will the project be to the community?</td><td>This question attempts to assign priority based on the potential perceived value of the proposed project by the community.

The possible values for this question are based on a combination of the type of proposed hardening activity and the project sponsor's knowledge of the proposed hardening project:

<table><tr><td>Rebuild in Place</td><td>No Impact</td></tr><tr><td>Relocation</td><td>Negative or Positive</td></tr><tr><td>Conversion</td><td>Negative or Positive</td></tr></table></td></tr>
</table>

Third Party Impact – 5%

<table>
<tr><th>Template Question</th><th colspan="2">Data Collection Method</th></tr>
<tr><td>What are the major obstacles/risks for completing the project this year?</td><td colspan="2">This question attempts to assign priority based on potential delays that may be caused by the acquisition of permits or easements or any other relevant obstacle.

This is determined utilizing the project sponsor's knowledge of the proposed hardening project:</td></tr>
<tr><td rowspan="6">What type of investment, if any, is required by joint users to complete this project?</td><td colspan="2">This question attempts to assign priority based on potential impact that may be caused on third party attachers such as telecom and cable joint users.

The possible values for this question are based on the type of proposed hardening activity:</td></tr>
<tr><td>Submersible UG</td><td>None</td></tr>
<tr><td>Small Wire Upgrade</td><td>Transfer at Same Location</td></tr>
<tr><td>Backlot-to-Frontlot Relocation</td><td>OH Relocation</td></tr>
<tr><td>OH to UG Conversion</td><td>OH to UG Conversion</td></tr>
<tr><td>Extreme Wind Upgrade</td><td>Transfer at Same Location</td></tr>
</table>

Overall Reliability – 30%

Template Question	Data Collection Method
What is the three year average $CEMI_4$ number of customers on this feeder?	This question attempts to assign priority based on potential reduction in the number of $CEMI_4$ customers impacted by the proposed project. The structure of our reliability maintenance programs is such that the customers that compose the $CEMI_4$ index vary from year to year. Because of this, a three year average of the $CEMI_4$ customers is utilized in determining the potential benefit of the proposed project.

<table>
<tr><th>Template Question</th><th>Data Collection Method</th></tr>
<tr><td>How many customer outages will this project potentially eliminate annually?</td><td>This question attempts to assign priority based on potential reduction in the number of customers outages provided by the proposed project.

Historical data is obtained over the previous three years indicating the number of customer interruptions (CI) in the proposed project as dictated by the upstream protecting device.

The CI is determined from adjusted (non-severe weather) data as this category is intended to identify the day to day reliability benefits of the proposed hardening project. The CI is also filtered according to certain cause codes which have been identified as those cause codes for which the proposed hardening activities can have a positive impact on.

The 3 year average of the identified CI under each particular cause code is taken and filtered against the internally developed "Rules of Thumb" matrix in Exhibit D. The Rules of Thumb matrix assigns a certain reduction percentage to the amount of CI based on the proposed hardening activity and the cause code it is intended to mitigate.</td></tr>
<tr><td>What is the potential change in the annual CAIDI that this project will result in?</td><td>This question attempts to assign priority based on potential reduction in the annual CAIDI the proposed project will bring.

The possible values for this question are based on the type of proposed hardening activity:

<table><tr><td>OH-to-UG Conversion</td><td>Increase</td></tr><tr><td>Highway Crossing OH-to-UG conversion</td><td>Decrease</td></tr><tr><td>Backlot-to-Frontlot Relocation</td><td>Decrease</td></tr><tr><td>All Others</td><td>No Change</td></tr></table></td></tr>
<tr><td>Will this project reduce the number of momentary customer interruptions on this section?</td><td>This question attempts to assign priority based on potential reduction in the annual MAIFI the proposed project will bring.

The possible values for this question are based on the type of proposed hardening activity:

<table><tr><td>OH-to-UG Conversion</td><td>Yes</td></tr><tr><td>Backlot-to-Frontlot Relocation</td><td>Yes</td></tr><tr><td>OH-to-Spacer Cable Conversion</td><td>Yes</td></tr><tr><td>All Others</td><td>No</td></tr></table></td></tr>
</table>

Template Question	Data Collection Method
What will be the change in the number of customers experiencing outages longer than 3 hours as a result of this project?	This question attempts to assign priority based on potential reduction in the number of $CELID_3$ customers impacted by the proposed project. The structure of our reliability maintenance programs is such that the customers that compose the $CELID_3$ index vary from year to year. Because of this, a three year average of the $CELID_3$ customers is utilized in determining the potential benefit of the proposed project. The number of customers experiencing an outage lasting longer than three hours is determined from adjusted (non-severe weather) data as this category is intended to identify the day to day reliability benefits of the proposed hardening project. This number is also filtered according to certain cause codes which have been identified as those cause codes for which the proposed hardening activities can have a positive impact on. The 3 year average of the identified customers under each particular cause code is taken and filtered against the internally developed "Rules of Thumb" matrix in Exhibit D. The Rules of Thumb matrix assigns a certain reduction percentage to the amount of customers based on the proposed hardening activity and the cause code it is intended to mitigate.

Financial (Cash Flow) Value – 20%

Template Question	Data Collection Method
Construction Costs	This question attempts to assign priority based on the expected construction costs of the proposed project. Internally developed costs estimated based on historical data are used in the construction cost estimation. The final result is shown as a cost to the utility

Template Question	Data Collection Method
Removal Equipment	This question attempts to assign priority based on the expected Removal costs of the proposed project. The estimated construction costs detailed above include minimal removal costs. This category is intended to capture the removal costs associated with major projects such as converting a line to underground or changing and entire pole line to a different pole class. If the proposed project does not fit any of these categories, the entered value is zero dollars. If the proposed project does fit under one of the above mentioned categories, the removal costs are estimated utilizing the STORMS system used internally for tracking work orders. Either case, the result shown should be a cost to the utility.
Vegetation Clearing	This question attempts to assign priority based on the annual vegetation management savings of the proposed project. The result shown in this section should represent a savings to the utility and is estimated by taking the per mile cost of vegetation management for rear lot and front lot lines and dividing it by the approved trimming cycle. If the proposed project does not involve an UG conversion or relocation of a line, the vegetation savings should be noted as zero dollars since this implies an existing overhead line will remain in place which would still require the same amount of vegetation management care.
Cost of future Maintenance	This question attempts to assign priority based on the annual maintenance costs of the proposed project. Maintenance costs are associated with on-going reliability maintenance programs such as wood pole and pad-mounted transformer inspections. The result shown in this section should represent a cost to the utility. Any net positive cash flow from the project should be entered as a negative number.

Template Question	Data Collection Method
Residual Value	This question attempts to assign priority based on the expected residual value of equipment removed by the proposed project. All equipment is assumed to have zero residual value unless it is considered major equipment that can be deployed somewhere else. Examples of major equipment include ABB reclosers and switchgears. Assigned residual values are equal to the full value of the unit at purchase. The result shown in this section should represent a savings to the utility.
Decrease in outage events	This question attempts to assign priority based on the potential reduction of in outage restoration costs gained by the proposed project. The structure of our reliability maintenance programs is such that the number of outages varies from year to year. Because of this, a three year average of the number of outages is utilized in determining the potential benefit of the proposed project. The number of outages is determined from adjusted (non-severe weather) data as this category is intended to identify the day to day cost benefits of the proposed hardening project. This number is also filtered according to certain cause codes which have been identified as those cause codes for which the proposed hardening activities can have a positive impact on. The 3 year average of the identified outages under each particular cause code is taken and filtered against the internally developed "Rules of Thumb" matrix in Exhibit D. The Rules of Thumb matrix assigns a certain reduction percentage to the amount of outages based on the proposed hardening activity and the cause code it is intended to mitigate. The number of outages obtained (represents the decrease in number of outages) is then multiplied by the most current weighted restoration cost matrix (represents average system restoration costs by device) to obtain the decrease outage dollar savings. The result shown in this section should represent a savings to the utility.

Results

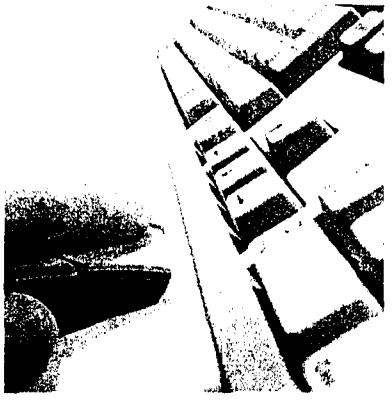
PEF followed the above process for each of the identified projects. The final project data sheet contained thirty six un-prioritized projects. This can be found in Exhibit E.

After collection the data for each project, PEF then conducted a detailed analysis of different prioritization scenarios to help assess whether the proposed set of projects were maximizing the total value of the portfolio.

To reach this goal three objectives were met: (1) developed an evaluation template that would allow Progress Energy to represent each project in a standardized way and to remove bias (2) identified a number of hardening projects that would reach all sections of their power delivery systems; and (3) load and analyze all hardening projects using AIS to come up with a prioritized list of hardening projects. Ultimately, PEF came up with the prioritized list found in Exhibit F.

Exhibit A

Asset Investment Strategy™ (AIS™)



About Davies Consulting, Inc.

Davies Consulting, Inc. (DCI) is an international strategy and management consulting firm dedicated to working with clients to establish sustainable competitive advantage and deliver superior value to their shareholders and customers.

Asset Investment Strategy™ (AIS™) Enhances the Strategic Decision-Making Process

Since Davies Consulting, Inc.'s (DCI) founding in 1991, the firm has been helping its utility clients implement asset management solutions. This evolution culminated in the development of the Asset Investment Strategy™ (AIS™), in collaboration with multiple utilities, in 2003. Today, AIS is the only fully-integrated, web-based, and effective asset management portfolio optimization tool on the market. Through constant client feedback, user groups, and a rigorous development process, DCI continues to enhance AIS while ensuring that it remains useful, usable, and used.

Use of the AIS process and tool facilitates management's selection of an optimal investment portfolio and provides a dynamic mechanism for ongoing evaluation and update of that portfolio. AIS is driven by an organization's business strategy, integrates risk assessment into scenario analysis, ties strategic objectives to projected portfolio performance, and allows for mid-course reallocation of resources. The combination of AIS's structured process and roles and an objective and validated decision-support tool results in a robust, broadly-supported outcome.

The AIS™ Process

DCI's AIS approach includes three equally important and dependent elements:

1. Implementation of a dynamic, criteria-based process that facilitates decision-making and ongoing evaluation;
2. Formulation of a set of roles and responsibilities that supports the process; and
3. Adoption of a web-based decision support software tool that enables analysis and reporting.

The AIS process includes development of a strategic framework for evaluating investment projects, review and analysis of multiple scenarios, and ongoing monitoring and evaluation. A critical component of the AIS approach is the process for challenging investment assumptions at multiple stages of the approach.

davies consulting inc.

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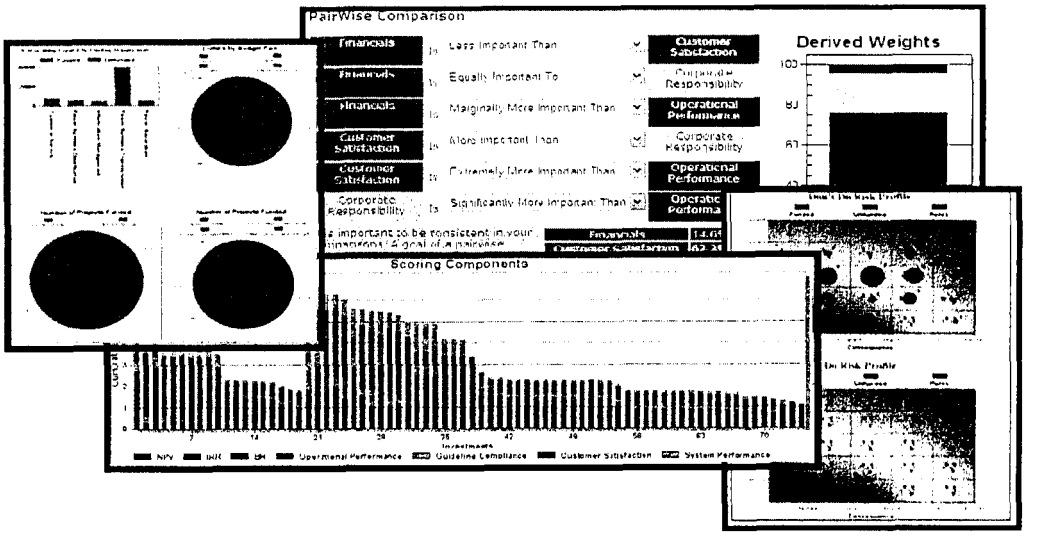
Figure 1: AIS™ Process



The AIS™ Tool

A critical component of AIS is the web-based decision-support tool, which optimizes an investment portfolio within or across business units. Using value functions, AIS evaluates projects on specific client-determined and weighted criteria, which may include financial, operational, strategic, and public responsibility. These criteria are then used to optimize the portfolio and determine the appropriate level of funding.

AIS's user-friendly web-interface brings decision-making closer to stakeholders and facilitates consistency in investment evaluation. It also allows decision makers across the organization to set scenario parameters and analyze their own portfolios. This builds greater understanding of the process, enhances business savvy, and creates broader support for the outcome. AIS is a flexible tool that can easily be customized to meet specific client requirements. Below are some examples of interfaces and reports available in the web-AIS tool.

For further information on Davies Consulting, Inc. and our AIS Program, or any other DCI energy services, please contact Miki Deric at 301-652-4535, or by e-mail at energy@daviescon.com. You may also want to visit our website at www.daviescon.com.

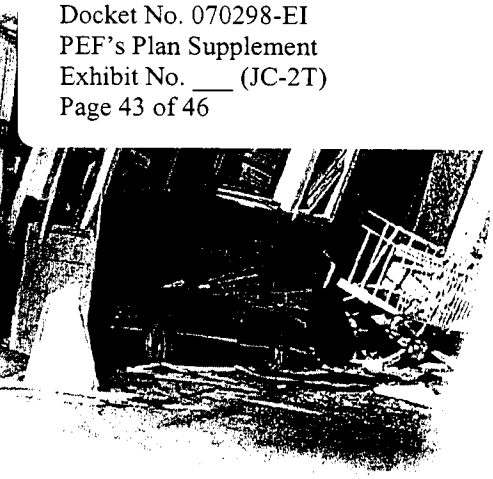
		Questions	Weight	Available Response	Expln Reqrd	Responses Criteria	Answer Value
Major Storm Outage Reduction Impact - 35%	1	At the end of this project, what percent of the exposure will be hardened?	15.00%	Direct		Linear Function with a Range Between (1-100)	
	2	How many customers are served from this device?	15.00%	Direct		Linear Function with a Range Between (1-2000)	
	3	What will be the impact of this project on the restoration time during major storm?	20.00%	Minimal Reduction	N	Open wire to triplex	0
				Moderate Reduction	N	Back-lot to front lot or small wire	5
				Significant Reduction	N	OH - UG conversion	10
	4	At what level of hurricane will the area served by this feeder flood due to storm surges?	10.00%	Tropical Storm	N		10
				Cat 1/Cat 2	N		8
				Cat 3	N		6
				Cat 4/5	N		3
				No flood	N		0
	5a	What is the tree density (trees per mile) in the area served by this feeder or section?	20.00%	Open Spans	N		0
				Low Density	N		0
				Medium Density	N		0
				High Density	N		0
	5b	What level of tree damage will this project mitigate during a major storm?	20.00%	Increase Exposure	N		0
				No Change	N		0
				Slightly Decrease Exposure	N		0
				Significantly Decrease Exposure	N		0
	6	What is the annual probability of extreme wind (over 70 mph) (HAZUS probability) in the area served by this feeder or section?	20.00%	Direct		Linear Function with a Range Between (5-12)	
Community Storm Impact - 10%	1	How many priority 1 customers are on feeder?	30.00%	None	N		0
				1	N		3
				2-3	N		7
				>3	N		10
	2	How many critical customers does this project address? (911 call centers, etc.)	60.00%	None	N		0
				1	N		3
				2-3	N		7
				>3	N		10
	3	How valuable will the project be perceived by the community? - Rebuild in place (no notice) - no impact - Relocation - negative or positive. - Conversion - negative or positive	10.00%	High Negative	N		0
				Low negative	N		2
				No Impact	Y		5
				Low positive	N		7
				High Positive	N		10
Third Party Impact - 5%	1	What are the major obstacles/risks for completing the project this year? I.e. Easements, permits, etc.	80.00%	None	N		10
				Medium	N		5
				High	N		0
	2	What type of investment is required by joint users (telecoms and cable) to complete this project?	20.00%	None	N		10
				Transfer at same location	N		7
				OH relocation	N		3
				OH to UG	N		0
Overall Reliability - 30%	1	What is the 3-year average CEMI4 customers on this feeder?	25.00%	Direct		Linear Function with a Range Between (0-500)	
	2	How many customer outages will this project eliminate annually in regards to CI?	30.00%	Direct		Linear Function with a Range Between (0-1000)	
	3	What is the change in the annual outage duration that this project will result in (on the feeder or section)?	10.00%	Increase	N		0
				No change	N		5
				Decrease	N		10
	4	Will this project reduce the number of momentary customer interruptions on this section?	10.00%	Yes	N		10
				No	N		0
	5	Based on a 3-year average, what will be the change in the number of customers experiencing outages longer than 3 hours as a result of this project?	25.00%	Direct		Linear Function with a Range Between (0-50)	

FEMA's Latest Multi-Hazard Software

HAZUS®MH

EARTHQUAKE • WIND • FLOOD

What Could Happen?



How can we plan to minimize damage and loss of life in order to prevent natural hazard events from becoming natural disasters? Which buildings, roads, and bridges may be damaged and how great would the damage be? Which roads may be closed? Which areas may be affected if utilities failed? Which businesses will shut down?

How Can HAZUS®MH Help?

An important part of comprehensive community planning is understanding risks that may affect the physical, social, and economic components of a community. Communities who understand their vulnerability to natural hazards can make development decisions in light of those hazards and the risks associated with them.

FEMA introduces its latest risk assessment and loss estimation software package, **HAZUSMH** (Multi-Hazard – earthquake, hurricane wind, and flood), that can help answer complex questions about the consequences of a hazard event.

What Are the Impacts of a Hazard Event?

HAZUSMH helps states, communities, and businesses, prepare for, mitigate the effects of, respond to, and recover from a hazard event. One of the great strengths of **HAZUSMH** is that it provides estimates of hazard-related damage before a disaster occurs and takes into account various impacts of a hazard event such as:

- Physical damage: damage to residential and commercial buildings, schools, critical facilities, and infrastructure
- Economic loss: lost jobs, business interruptions, repair and reconstruction costs
- Social impacts: impacts to people, including requirements for shelters and medical aid

HAZUSMH and Its Unique Features

HAZUSMH can quantify the risk for a study area of any size: region, state, community, neighborhood, or an individual site. **HAZUSMH** uses GIS technology to combine hazard layers with national databases and applies a standardized loss estimation and risk assessment methodology. The GIS-based environment allows users to create graphics to help communities visualize and understand their hazard risks and solutions. The nationwide databases built into **HAZUSMH** include datasets on demographics, building stock, essential facilities, transportation, utilities, and high-potential-loss facilities.

HAZUSMH can estimate losses from earthquakes, hurricane winds, and floods. **HAZUSMH** uses:

- Ground motion and ground failure information to calculate losses for earthquakes
- Information on wind pressure, windborne missiles, and rain for hurricane winds
- Flood frequency, depth, discharge, and velocity for floods

Exhibit D

Storm Hardening Specification "Rules of Thumb" % Reductions	Trees 004 / 008	Storm 014	Lightning 001	Animal 003	Unknown 000	Connector 007	Wind 010	Birds 040	Vehicle 005	Corrosion 012	UG Cable 032	Dig In 017	OH / Sec Services 030
OH to UG Conversions	90%	90%	95%	95%	90%	95%	95%	100%	90%	-10%	-5%	-10%	100%
Small Wire Reconductor	10%	10%	25%	0%	25%	75%	25%	0%	0%	0%	0%	0%	0%
Submersible UG	0%	5%	0%	0%	0%	50%	0%	0%	0%	100%	50%	0%	0%
Extreme Wind Upgrades	25%	50%	0%	0%	25%	95%	95%	-10%	-25%	0%	0%	0%	0%
Open Wire Secondary to Triplex TX Level Outages	90%	90%	0%	90%	90%	90%	50%	75%	0%	0%	0%	0%	75%
Rear lot Relocations	75%	75%	0%	50%	50%	50%	75%	25%	-10%	0%	0%	0%	50%
Horizontal to Vertical Construction	50%	50%	0%	0%	0%	0%	-5%	-10%	0%	0%	0%	0%	0%
OH Spacer Cable Conversions	25%	25%	0%	0%	0%	25%	25%	75%	0%	0%	0%	0%	0%

20

Total Rank	Total Value	Quartile	Project Name	Sub Category	Op Unit	Major Storm Outage Reduction Impact Rank	Major Storm Outage Reduction Impact Results	Community Storm Impact Rank	Community Storm Impact Results	Third Party Impact Rank	Third Party Impact Results	Overall Reliability Rank	Overall Reliability Results	Total Financial Value Rank	Total Financial Value
1	6.9811	Q1	Calle De Sol	OH to UG Conversion	South Central	1	3.5	20	0.25	25	0.2	3	1.3632	17	1.66794
2	6.1025	Q1	St Geroge Is - Plantation	Submersible UG	North Coastal	5	3.07388	15	0.32	1	0.5	2	1.428	30	0.78052
3	6.0727	Q1	SR-408 @ Woodbury Rd	OH to UG Conversion	North Central	8	2.699235	7	0.52	14	0.4	10	0.6	5	1.85346
4	6.0636	Q1	Winderlakes	OH to UG Conversion	South Central	1	3.5	20	0.25	25	0.2	10	0.6	21	1.51356
5	5.8747	Q1	R448 - Dunnellon	Back lot to Front lot conversion	North Coastal	9	2.64292	34	0.07	11	0.43	4	1.206	20	1.52574
6	5.6675	Q1	US 98 - Brooksville	Small Reconductor	North Coastal	6	2.91515	12	0.47	4	0.47	5	1.0326	31	0.77974
7	5.4757	Q1	US 441 west of Hwy 19	OH to UG Conversion	North Central	16	1.79375	1	1	22	0.3	10	0.6	12	1.78192
8	4.8944	Q1	Coquina Key	Small Reconductor	South Coastal	1	3.5	16	0.28	4	0.47	9	0.6444	35	0
9	4.82	Q1	I-4 @ North St	OH to UG Conversion	North Central	12	2.268735	22	0.1	27	0	10	0.6	6	1.85122
10	4.7095	Q2	Florida Turnpike @ Sandlake Rd (746)	OH to UG Conversion	North Central	17	1.71185	16	0.28	14	0.4	10	0.6	16	1.7177
11	4.6798	Q2	OH Crossing of Turnpike (K68 @K5255)	OH to UG Conversion	South Central	22	1.367975	7	0.52	14	0.4	10	0.6	11	1.79084
12	4.6353	Q2	I-4 @ Fairbanks Ave	OH to UG Conversion	North Central	13	2.202375	22	0.1	27	0	10	0.6	14	1.73292
13	4.5518	Q2	A192 - Luraville	Small Reconductor	North Coastal	10	2.511915	4	0.68	4	0.47	31	0.42	32	0.4699
14	4.535	Q2	Us 17/92 & SR-436	OH to UG Conversion	North Central	18	1.59782	5	0.61	27	0	10	0.6	15	1.7272
15	4.5034	Q2	Indigo	Small Reconductor	South Coastal	19	1.51844	22	0.1	4	0.47	7	0.864	19	1.551
16	4.4816	Q2	OH Crossing of Turnpike 2 (K1780 @ K5434991 and K1775 @ K5021)	OH to UG Conversion	South Central	23	1.33868	2	0.79	14	0.4	10	0.6	25	1.35296
17	4.4188	Q2	I-4 @ Orange St	OH to UG Conversion	North Central	14	1.85122	22	0.1	27	0	10	0.6	3	1.86762
18	4.4174	Q2	Florida Turnpike @ Sandlake Rd (485)	OH to UG Conversion	North Central	34	0.903	3	0.7	14	0.4	10	0.6	8	1.81444
19	4.4118	Q3	OH Crossing of Turnpike (K1780 @K2379)	OH to UG Conversion	South Central	20	1.50773	22	0.1	14	0.4	10	0.6	10	1.80402
20	4.3708	Q3	US 301 - Citra	Small Reconductor	North Coastal	32	0.94731	35	0.05	23	0.27	1	1.6098	22	1.49372
21	4.3267	Q3	Feeder X220	Extreme Wind Upgrades	South Coastal	4	3.231025	10	0.49	23	0.27	36	0.3	34	0.0357
22	4.3151	Q3	Sprint Earth Station & Cocoa Water Wells	Small Reconductor	North Central	7	2.834895	22	0.1	4	0.47	6	0.9102	36	0
23	4.307	Q3	I-4 @ SR-436	OH to UG Conversion	North Central	11	2.487765	22	0.1	27	0	10	0.6	27	1.11924
24	4.1526	Q3	Florida Turnpike @ Orange Blossom Trail	OH to UG Conversion	North Central	33	0.93926	16	0.28	14	0.4	10	0.6	1	1.93334
25	4.0112	Q3	Floramar Subdivision	Submersible UG	South Coastal	24	1.29745	13	0.44	1	0.5	30	0.537	26	1.23676
26	3.99	Q3	Hoffner Ave and feeder Tie	Small Reconductor	North Central	15	1.816185	14	0.34	11	0.43	32	0.396	29	1.0078
27	3.9747	Q3	I-4 @ Oranole Road/Lake Destiny Dr.	OH to UG Conversion	North Central	21	1.40749	22	0.1	27	0	10	0.6	4	1.86724
28	3.9336	Q4	OH Crossing of Turnpike (K1025 @ K1025 & K1028 @ K128)	OH to UG Conversion	South Central	30	1.089375	16	0.28	14	0.4	10	0.6	18	1.56426
29	3.8994	Q4	Holden Ave E) Orange Blossom Trail	Small Reconductor	North Central	26	1.24817	10	0.49	11	0.43	8	0.6588	28	1.0724
30	3.6886	Q4	Homosassa - Riverhaven	Submersible UG	North Coastal	25	1.294755	35	0.05	1	0.5	33	0.354	23	1.48986
31	3.6755	Q4	I-4 @ EE-Wiliamson Rd	OH to UG Conversion	North Central	28	1.1473	22	0.1	27	0	10	0.6	7	1.8282
32	3.6512	Q4	I-4 @ SR-434	OH to UG Conversion	North Central	29	1.146565	22	0.1	27	0	10	0.6	9	1.80462
33	3.6303	Q4	I-4 @ Lee Rd	OH to UG Conversion	North Central	27	1.184365	22	0.1	27	0	10	0.6	13	1.74594
34	3.5972	Q4	I-4 @ Kennedy Blvd	OH to UG Conversion	North Central	31	0.98749	22	0.1	27	0	10	0.6	2	1.9097
35	3.1964	Q4	Highland Park	Small Reconductor	South Central	36	0.37163	5	0.61	4	0.47	35	0.3078	24	1.437
36	2.2727	Q4	Hibiscus Feeder Tie	Small Reconductor	South Central	35	0.736225	7	0.52	4	0.47	34	0.3468	33	0.19974

SCANNED

FCTA 8/15/07 Updated Responses To FPSC Final Issues List For Progress Energy In Docket No. 070298-EI

1. **Does the Company's Plan meet the desired objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical, and cost-effective manner to the affected parties? [Rule 25-6.0342(2)].**

Please see response to Question 14 below.

2. **Does the Company's Plan address the extent to which, at a minimum, the Plan complies with the National Electric Safety Code (ANSI C-2) [NESC] that is applicable to subsection 25-6.0345(2), F.A.C. [Rule 25-6.0342(3)(a)].**

No objection.

3. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for new distribution facility construction? [Rule 25-6.0342(3)(b)1].**

FCTA supports PEF's plan to use Grade C as the basic standard for new distribution facility construction with evaluation using AIS.

4. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for major planned work on the distribution system, including expansion, rebuild, or relocation of existing facilities, assigned on or after the effective date of this rule distribution facility construction? [Rule 25-6.0342(3)(b)2].**

FCTA supports PEF's plan to use Grade C as the basic standard for major planned work with evaluation using AIS subject to the information exchange provided for in the proposed Third Party Notification Process.

5. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for distribution facilities serving critical infrastructure facilities and along major thoroughfares taking into account political and geographical boundaries and other applicable operational consideration? [Rule 25-6.0342(3)(b)3].**

FCTA supports PEF's plan to adopt either Grade B and extreme wind loading standards for limited pilot projects for critical infrastructure subject to the information exchange provided for in the proposed Third Party Notification Process.

6. **Does the Company's Plan address the extent to which its distribution facilities are designed to mitigate damage to underground and supporting overhead transmission and distribution facilities due to flooding and storm surges? [Rule 25-6.0342(3)(b)(3)(c)].**

No objection.

7. **Does the Company's Plan address the extent to which the placement of new and replacement distribution facilities facilitate safe and efficient access for installation and maintenance pursuant to Rule 25-6.0341, F.A.C.? [Rule 25-6.0342(3)(d)].**

No objection.

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070298-EI EXHIBIT 11
COMPANY PEF (Direct)
WITNESS Jason Cutliffe (JC-3T)
DATE 10/02-03/07

FCTA 8/15/07 Updated Responses To FPSC Final Issues List For Progress Energy In Docket No. 070298-EI

8. **Does the Company's Plan provide a detailed description of its deployment strategy including a description of the facilities affected; including technical design specifications, construction standards, and construction methodologies employed? [Rule 25-6.0342(4)(a)].**

Yes subject to the information exchange provided for in the proposed Third Party Notification Process.

And, PEF has stated that it is using Pole Foreman for its strength and loading assessments. However, Pole Foreman may not take into account the guying effects of the lines on the poles. PEF's engineering criteria for strength testing should include the guying effects of other lines and guys on the pole.

9. **Does the Company's Plan provide a detailed description of the communities and areas within the utility's service area where the electric infrastructure improvements, including facilities identified by the utility as critical infrastructure and along major thoroughfares pursuant to subparagraph (3)(b)3 are to be made? [Rule 25-6.0342(3)(b)].**

Yes subject to the information exchange provided for in the proposed Third Party Notification Process.

10. **Does the Company's Plan provide a detailed description of the extent to which the electric infrastructure improvements involve joint use facilities on which third-party attachments exists? [Rule 25-6.0342(4)(c)].**

Yes, the Company's Plan, as supplemented August 7, 2007, complies, subject to the ongoing information exchange provided for in the proposed Third Party Notification Process.

11. **Does the Company's Plan provide an estimate of the costs and benefits to the utility of making the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages? [Rule 25-6.0342(4)(d)].**

Yes subject to 12.

12. **Does the Company's Plan provide an estimate of the costs and benefits, obtained pursuant to subsection (6) below, to third-party attachers affected by the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages realized by the third-party attachers? [Rule 25-6.0342(4)(e)].**

PEF's storm hardening plan does not provide enough information about the costs and benefits to third party attachers to enable attachers to provide a specific estimate of the costs and benefits that PEF's plan will have on its cable operator members. However, the costs that may be recovered from cable operators are tightly prescribed by the FCC. Under the federal scheme, FCTA members pay both makeready costs – i.e., the cost of making the pole ready for its attachments (including the cost of rearranging existing facilities on the pole, guying the pole to increase strength, or replacing the pole where necessary) and annual rent pursuant to the FCC's rate formula, which assures that pole owners receive the fully allocated costs of accommodating the attachment. The annual pole attachment rent is determined by multiplying the percentage of the total usable space occupied by the pole attachment by the sum of the operating expenses and actual capital costs of the utility attributable to the entire pole. In addition, depending upon the circumstances, cable operators may incur the cost of transferring their facilities to a new pole.

Resolution is tied to resolution of Issue 13.

FCTA 8/15/07 Updated Responses To FPSC Final Issues List For Progress Energy In Docket No. 070298-EI

13. **Does the Company's Plan include written Attachment Standards and Procedures addressing safety, reliability, pole loading capacity, and engineering standards and procedures for attachments by others to the utility's electric transmission and distribution poles that meet or exceed the edition of the National Electrical Safety Code (ANSI C-2) that is applicable pursuant to Rule 25-6.034, F.A.C.? [Rule 25-6.0342(5)].**

- Subject to conditions set forth in Bullets 3, 4 and 5, FCTA is willing to stipulate that PEF has standards and procedures for attachments by others that meet or exceed the NESC.
- Subject to conditions set forth in bullets 3, 4 and 5, FCTA is willing to stipulate that PEF's standards and procedures address safety, reliability, pole loading capacity, and engineering standards and procedures for attachments by others to PEF's poles.
- FCTA does not agree with all aspects of PEF's standards and procedures as currently set forth in the plan. FCTA is willing to stipulate that the details of PEF's standards and procedures should not be in the plan but instead should be established through good faith contract negotiation with input from attachers as required by rule 26-06.0342(6) and/or FCC resolution.
    - Input should include pre-construction coordination and on site meetings (which FPL has committed to do).
- PEF's Plan needs to be amended to delete specific standards and procedures.
- PEF's Plan needs to be amended to clarify how it will obtain input from third party attachers in developing attachment standards and procedures and in modifying its storm hardening plan going forward as required by Rule 26-06.0342(6).
- Subject to agreement on Bullets 3, 4, and 5, FCTA's position is that PEF's attachment standards and procedures should not be approved by the Commission.

14. **Based on the resolution of the preceding issues, should the Commission find that the Company's Plan meets the desired objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical, and cost-effective manner to the affected parties. [Rule 25-6.0342(1) and (2)]**

Yes, subject to Issue 13 and information exchange provided for in the proposed Third Party Notification Process.

AT&T Florida's Initial Responses to Staff's Preliminary Draft Issu
Dockets 070297-EI – 070301-EI re: Progress Energy Storm Hardening Plan

1. **Does the Company's Plan meet the desired objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical, and cost-effective manner to the affected parties? [Rule 25-6.0342(2)]**

It is AT&T Florida's understanding that Staff is removing this issue as redundant of issue number 14 below.

2. **Does the Company's Plan address the extent to which, at a minimum, the Plan complies with the National Electric Safety Code (ANSI C-2) [NESC] that is applicable pursuant to subsection 25-6.0345(2), F.A.C. [Rule 25-6.0342(3)(a)]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

3. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for new distribution facility construction? [Rule 25-6.0342(3)(b)l]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

4. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for major planned work on the distribution system, including expansion, rebuild, or relocation of existing facilities, assigned on or after the effective date of this rule distribution facility construction? [Rule 25-6.0342(3)(b)2]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

5. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for distribution facilities serving critical infrastructure facilities and along major thoroughfares taking into account political and geographical boundaries and other applicable operational considerations? [Rule 256.0342(3)(b)3]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

6. **Does the Company's Plan address the extent to which its distribution facilities are designed to mitigate damage to underground and supporting overhead transmission and distribution facilities due to flooding and storm surges? [Rule 25-6.0342(3)(c)]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

7. **Does the Company's Plan address the extent to which the placement of new and replacement distribution facilities facilitate safe and efficient access for installation and maintenance pursuant to Rule 25- 6.0341, F.A.C? [Rule 25-6.0342(3)(d)]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

8. **Does the Company's Plan provide a detailed description of its deployment strategy including a description of the facilities affected; including technical design specifications, construction standards, and construction methodologies employed? [Rule 25-6.0342(4)(a)]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

9. **Does the Company's Plan provide a detailed description of the communities and areas within the utility's service area where the electric infrastructure improvements, including facilities identified by the utility as critical infrastructure and along major thoroughfares pursuant to subparagraph (3)(b)3. are to be made? [Rule 25-6.0342(4)(b)]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

10. **Does the Company's Plan provide a detailed description of the extent to which the electric infrastructure improvements involve joint use facilities on which third-party attachments exist? [Rule 25-6.0342(4)(c)]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

11. **Does the Company's Plan provide an estimate of the costs and benefits to the utility of making the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages? [Rule 25-6.0342(4)(d)]**

No, until AT&T Florida completes its review of Progress Energy's proposed 2007 projects as set forth in response 14 below, AT&T Florida is not in a position to stipulate to this issue at this time.

12. **Does the Company's Plan provide an estimate of the costs and benefits, obtained pursuant to subsection (6) below, to third-party attachers affected by the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages realized by the third-party attachers? [Rule 25-6.0342(4)(e)]**

No, because AT&T Florida does not have adequate information to complete its cost-benefit analysis of Progress Energy's proposed 2007 hardening projects as set forth in response 14, AT&T Florida is not in a position to stipulate to this issue at this time.

13. **Does the Company's Plan include written Attachment Standards and Procedures addressing safety, reliability, pole loading capacity, and engineering standards and procedures for attachments by others to the utility's electric transmission and distribution poles that meet or exceed the edition of the National**

Electrical Safety Code (ANSI C-2) that is applicable pursuant to Rule 25-6.034, F.A.C.? [Rule 25-6.0342(5)]

No, pending further discussions with Progress Energy regarding its Attachment Standards and Procedures, AT&T Florida is not in a position to stipulate to this issue at this time.

14. Based on the resolution of the preceding issues, should the Commission find that the Company's Plan meets the desired objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical, and cost-effective manner to the affected parties.[Ride 25-6.0342(1) and (2)]

No. AT&T Florida is still gathering and reviewing details of Progress Energy's proposed 2007 projects so that AT&T Florida can determine the total number of its attachments that will be impacted and the extent and type of work that needs to be done. Until that review is complete and it has been determined what costs, if any, Progress Energy will seek from AT&T Florida, AT&T Florida cannot assess whether Progress Energy's plan meets the desired objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical and cost-effective manner. AT&T Florida has been having a continuous dialogue with Progress Energy regarding these issues and hopes to reach a resolution on these issues. Additionally, AT&T Florida will not be able to take a position on this issue with regard to Progress Energy's proposed hardening projects for 2008 and 2009 until detailed information on those projects is provided for AT&T Florida's review and analysis.

Preliminary Generic Draft Issues: Docket 070298-EI
Verizon Positions on PEF Plan

1. Does the Company's Plan meet the desired objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical, and cost-effective manner to the affected parties? [Rule 25-6.0342(2)]

See Verizon's response to Issue No. 14.

2. **Does the Company's Plan address the extent to which, at a minimum, the Plan complies with the National Electric Safety Code (ANSI C-2) [NESC] that is applicable pursuant to subsection 25-6.0345(2), F.A.C. [Rule 25-6.0342(3)(a)]**

No. Although the Company's Plan addresses this subject, Verizon cannot complete its assessment of this aspect of the Plan until sufficient project level detail has been provided.

3. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for new distribution facility construction? [Rule 25-6.0342(3)(b)1]**

No. Although the Company's Plan addresses this subject, Verizon cannot complete its assessment of this aspect of the Plan until sufficient project level detail has been provided.

4. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for major planned work on the distribution system, including expansion, rebuild, or relocation of existing facilities, assigned on or after the effective date of this rule distribution facility construction? [Rule 25-6.0342(3)(b)2]**

No. Although the Company's Plan addresses this subject, Verizon cannot complete its assessment of this aspect of the Plan until sufficient project level detail has been provided.

5. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for distribution facilities serving critical infrastructure facilities and along major thoroughfares taking into account political and geographical boundaries and other applicable operational considerations? [Rule 25-6.0342(3)(b)3]**

No. Although the Company's Plan addresses this subject, Verizon cannot complete its assessment of this aspect of the Plan until sufficient project level detail has been provided.

6. **Does the Company's Plan address the extent to which its distribution facilities are designed to mitigate damage to underground and supporting overhead transmission and distribution facilities due to flooding and storm surges? [Rule 25-6.0342(3)(c)]**

No. Although the Company's Plan addresses this subject, Verizon cannot complete its assessment of this aspect of the Plan until sufficient project level detail has been provided.

Preliminary Generic Draft Issues: Docket 070298-EI
Verizon Positions on PEF Plan

7. **Does the Company's Plan address the extent to which the placement of new and replacement distribution facilities facilitate safe and efficient access for installation and maintenance pursuant to Rule 25-6.0341, F.A.C? [Rule 25-6.0342(3)(d)]**

No. Although the Company's Plan addresses this subject, Verizon cannot complete its assessment of this aspect of the Plan until sufficient project level detail has been provided.

8. **Does the Company's Plan provide a detailed description of its deployment strategy including a description of the facilities affected; including technical design specifications, construction standards, and construction methodologies employed? [Rule 25-6.0342(4)(a)]**

No. The Plan provides a general description of the facilities affected for 2007, including a list of possible projects identified by the AIS model, but the Plan lacks such a general description for 2008-09 projects and lacks project level detail for 2007-09. Verizon notes that the Company has provided certain additional project information to Verizon that is not included in the Plan.

9. **Does the Company's Plan provide a detailed description of the communities and areas within the utility's service area where the electric infrastructure improvements, including facilities identified by the utility as critical infrastructure and along major thoroughfares pursuant to subparagraph (3)(b)3, are to be made? [Rule 25-6.0342(4)(b)]**

No. The Plan provides a general description of the facilities affected for 2007, including a list of possible projects identified by the AIS model, but the Plan lacks such a general description for 2008-09 projects and lacks project level detail for 2007-09. Verizon notes that the Company has provided certain additional project information to Verizon that is not included in the Plan.

10. **Does the Company's Plan provide a detailed description of the extent to which the electric infrastructure improvements involve joint use facilities on which third-party attachments exist? [Rule 25-6.0342(4)(c)]**

No. The Plan does not provide a detailed description of the extent to which the electric infrastructure improvements involve joint use facilities with third-party attachments.

11. **Does the Company's Plan provide an estimate of the costs and benefits to the utility of making the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages? [Rule 25-6.0342(4)(d)]**

No. Although the Plan includes high level cost estimates for 2007-09 of making infrastructure improvements, Verizon cannot complete its assessment of this aspect of the Plan until sufficient project level detail has been provided. Moreover, the Plan does not estimate or quantify the net benefits, if any, of implementing the Plan.

Preliminary Generic Draft Issues: Docket 070298-EI
Verizon Positions on PEF Plan

12. **Does the Company's Plan provide an estimate of the costs and benefits, obtained pursuant to subsection (6) below, to third-party attachers affected by the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages realized by the third-party attachers? (Rule 25-6.0342(4)(e))**

No. The Plan does not provide such an estimate. Based on the information that has been provided thus far, Verizon is working to provide an initial estimate of its costs. Verizon will not be able to provide a complete assessment of the costs and benefits (if any) until sufficient project level detail has been provided.

13. **Does the Company's Plan include written Attachment Standards and Procedures addressing safety, reliability, pole loading capacity, and engineering standards and procedures for attachments by others to the utility's electric transmission and distribution poles that meet or exceed the edition of the National Electrical Safety Code (ANSI C-2) that is applicable pursuant to Rule 25-6.034, FAC.? [Rule 25-6.0342(5)]**

No. Although the Company's Plan includes attachment standards and procedures, Verizon objects to them to the extent they purport to impose rates, terms and conditions that are inconsistent with the parties' joint use agreement.

14. **Base on the resolution of the preceding issues, should the Commission find that the Company's Plan meets the desired objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical, and cost-effective manner to the affected parties. [Rule 25-6.0342(1) and (2)]**

No. The Plan should be supplemented to provide sufficient project level detail. Moreover, based on Verizon's objections stated in response to the previous issues, the Plan fails to demonstrate that it achieves the objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical, and cost-effective manner to the affected parties.

Embarq Florida, Inc.'s Initial Responses to Staff's Preliminary Draft Issues
Dockets 070297-EI – 070301-EI

1. **Does the Company's Plan meet the desired objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical, and cost-effective manner to the affected parties? [Rule 25-6.0342(2)]**

   Embarq understands that Staff is removing this issue as redundant of issue number 14 below.

2. **Does the Company's Plan address the extent to which, at a minimum, the Plan complies with the National Electric Safety Code (ANSI C-2) [NESC] that is applicable pursuant to subsection 25-6.0345(2), F.A.C. [Rule 25-6.0342(3)(a)]**

   FPL: Embarq has no position at this time.

   PEC: Embarq has no position at this time.

   TECO: Embarq has no position at this time.

   GULF: Embarq has no position at this time.

3. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for new distribution facility construction? [Rule 25-6.0342(3)(b)l]**

   FPL: Embarq has no position at this time.

   PEC: Embarq has no position at this time.

   TECO: Embarq has no position at this time.

   GULF: Embarq has no position at this time.

4. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for major planned work on the distribution system,**

including expansion, rebuild, or relocation of existing facilities, assigned on or after the effective date of this rule distribution facility construction? [Rule 25-6.0342(3)(b)2]

FPL: Embarq has no position at this time.

PEC: Embarq has no position at this time.

TECO: Embarq has no position at this time.

GULF: Embarq has no position at this time.

5. **Does the Company's Plan address the extent to which the extreme wind loading standards specified by Figure 250-2(d) of the 2007 edition of the NESC are adopted for distribution facilities serving critical infrastructure facilities and along major thoroughfares taking into account political and geographical boundaries and other applicable operational considerations? [Rule 256.0342(3)(b)3]**

FPL: Embarq has no position at this time.

PEC: Embarq has no position at this time.

TECO: Embarq has no position at this time.

GULF: Embarq has no position at this time.

6. **Does the Company's Plan address the extent to which its distribution facilities are designed to mitigate damage to underground and supporting overhead transmission and distribution facilities due to flooding and storm surges? [Rule 25-6.0342(3)(c)]**

FPL: Embarq has no position at this time.

PEC: Embarq has no position at this time.

TECO: Embarq has no position at this time.

GULF: Embarq has no position at this time.

7. **Does the Company's Plan address the extent to which the placement of new and replacement distribution facilities facilitate safe and efficient access for installation and maintenance pursuant to Rule 25- 6.0341, F.A.C? [Rule 25-**

6.0342(3)(d)]

FPL: Embarq has no position at this time.

PEC: Embarq has no position at this time.

TECO: Embarq has no position at this time.

GULF: Embarq has no position at this time.

8. **Does the Company's Plan provide a detailed description of its deployment strategy including a description of the facilities affected; including technical design specifications, construction standards, and construction methodologies employed? [Rule 25-6.0342(4)(a)]**

FPL: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

PEC: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

TECO: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding,

Embarq reserves the right to revise its position.

GULF: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

9. **Does the Company's Plan provide a detailed description of the communities and areas within the utility's service area where the electric infrastructure improvements, including facilities identified by the utility as critical infrastructure and along major thoroughfares pursuant to subparagraph (3)(b)3. are to be made? [Rule 25-6.0342(4)(b)]**

FPL: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

PEC: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

TECO: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an

ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

GULF: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

10. Does the Company's Plan provide a detailed description of the extent to which the electric infrastructure improvements involve joint use facilities on which third-party attachments exist? [Rule 25-6.0342(4)(c)]

FPL: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

PEC: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

TECO: Embarq has received information from the Company that appears to provide the necessary detail related to

Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

GULF: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

11. Does the Company's Plan provide an estimate of the costs and benefits to the utility of making the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages? [Rule 25-6.0342(4)(d)]

FPL: Embarq has no position at this time.

PEC: Embarq has no position at this time.

TECO: Embarq has no position at this time.

GULF: Embarq has no position at this time.

12. Does the Company's Plan provide an estimate of the costs and benefits, obtained pursuant to subsection (6) below, to third-party attachers affected by the electric infrastructure improvements, including the effect on reducing storm restoration costs and customer outages realized by the third-party attachers? [Rule 25-6.0342(4)(e)]

FPL: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq is currently reviewing the information provided and revising its costs based on the additional detail provided. Embarq understands that it is currently contemplated that details for years

2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its costs and position on this issue, based on these revisions.

PEC: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq is currently reviewing the information provided and revising its costs based on the additional detail provided. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its costs and position on this issue, based on these revisions.

TECO: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Based on the information provided, it appears TECO's current plan will have no cost impact on Embarq. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its costs and position on this issue, based on these revisions.

GULF: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq is currently reviewing the information provided and revising its costs based on the additional detail provided. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that

the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its costs and position on this issue, based on these revisions.

13. Does the Company's Plan include written Attachment Standards and Procedures addressing safety, reliability, pole loading capacity, and engineering standards and procedures for attachments by others to theutility's electric transmission and distribution poles that meet or exceed the edition of the National Electrical Safety Code (ANSI C-2) that is applicable pursuant to Rule 25-6.034, F.A.C.? [Rule 25-6.0342(5)]

FPL: Embarq is in the process of reviewing the Company's Attachment Standards and Procedures included with the plan and the affect of those standards and procedures on Embarq's current operations, if any.

PEC: Embarq is in the process of reviewing the Company's Attachment Standards and Procedures included with the plan and the affect of those standards and procedures on Embarq's current operations, if any.

TECO: Embarq is in the process of reviewing the Company's Attachment Standards and Procedures included with the plan and the affect of those standards and procedures on Embarq's current operations, if any.

GULF: Embarq is in the process of reviewing the Company's Attachment Standards and Procedures included with the plan and the affect of those standards and procedures on Embarq's current operations, if any.

14. **Based on the resolution of the preceding issues, should the Commission find that the Company's Plan meets the desired objectives of enhancing reliability and reducing restoration costs and outage times in a prudent, practical, and cost-effective manner to the affected parties.[Ride 25-6.0342(1) and (2)].**

FPL: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq is currently reviewing the information provided and preparing revised estimates of its cost/benefit analysis based on the additional detail provided. Embarq understands that it is

currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

PEG: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq is currently reviewing the information provided and preparing revised estimates of its cost/benefit analysis based on the additional detail provided. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

TECO: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Based on the information provided, it appears TECO's current plan will have no cost impact on Embarq. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a result of this proceeding, Embarq reserves the right to revise its position.

GULF: Embarq has received information from the Company that appears to provide the necessary detail related to Embarq for the Company's storm hardening plans for Calendar Year 2007. Embarq is currently reviewing the information provided and preparing revised estimates of its cost/benefit analysis based on the additional detail provided. Embarq understands that it is currently contemplated that details for years 2008 and 2009 will be finalized through an ongoing process and review and that the parties are currently working to reach a stipulation on this process. To the extent that the Company's plan is revised as a

result of this proceeding, Embarq reserves the right to revise its position.

SCANNED

Mickey B. Gunter
Consulting Engineer
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(Retired)

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Summary:

BS, Industrial Engineering, 1966 Georgia Institute of Technology.

38+ years experience in Distribution Engineering Design, Standards, and Training.

Presently serve on (3) ANSI C-2 National Electrical Safety Code (NESC) Sub-committees (Sub-committee 4, Sub-committee 7, and the Interpretations Committee); the Southeastern Electric Exchange (SEE) NESC (Chairman); and the Edison Electric Institute (EEI) NESC (Sub-committee 4). Active in the NESC since December 1993. Active participation on the 1997, 2002, and 2007 NESC revisions.

Currently involved in teaching National Electrical Safety Code schools for the Southern Company and various other electric utilities.

Work Experience:

September 2004 - Retired

1990 - 2004
Responsible for developing and maintaining Georgia Power Company's Distribution Specifications. Also involved in conducting Construction Standards update forums for line personnel and engineers along with assisting in developing and teaching distribution engineering schools (line design, NESC, and other engineering related topics).

1984 - 1990
Responsible for approving all large engineering projects, and supervising mapping, metering and fleet activities for the Rome Division of Georgia Power Company.

1983 - 1984
Responsible for supervising all distribution engineering, line construction, metering, and training activities in the Rome District of Georgia Power Company.

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WITNESS Mickey Gunter (MG-1T)
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1973 - 1983
Responsible for reviewing and approving all large distribution engineering projects, and supporting planning and training activities in the Rome Division of Georgia Power Company.

1971 - 1973
Responsible for distribution engineering, operations, and maintenance activities in the Austell District of Georgia Power Company.

1966 - 1971
Duties included general field engineering, planning, and trouble restoration in Metro Atlanta. This period also includes two years in the US Army (November 1966 – November 1968).

SCANNED

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2007 NESC Rule 250C
Exhibit No. ___ (MG-2T)
Page 1 of 3

Section 25.
Loadings for Grades B and C

250. General loading requirements and maps

A. General

1. It is necessary to assume the wind and ice loads that may occur on a line. Three weather loadings are specified in Rules 250B, 250C, and 250D. Where all three rules apply, the required loading shall be the one that has the greatest effect.

2. Where construction or maintenance loads exceed those imposed by Rule 250A1, the assumed loadings shall be increased accordingly. When temporary loads, such as lifting of equipment, stringing operations, or a worker on a structure or its component, are to be imposed on a structure or component, the strength of the structure or component should be taken into account or other provisions should be made to limit the likelihood of adverse effects of structure or component failure.

NOTE: Other provisions could include cranes that can support the equipment loads, guard poles and spotters with radios, and stringing equipment capable of promptly halting stringing operations.

3. It is recognized that loadings actually experienced in certain areas in each of the loading districts may be greater, or in some cases, may be less than those specified in these rules. In the absence of a detailed loading analysis, using the same respective statistical methodologies used to develop the maps in Rule 250C or 250D, no reduction in the loadings specified therein shall be made without the approval of the administrative authority.

4. The structural capacity provided by meeting the loading and strength requirements of Sections 25 and 26 provides sufficient capability to resist earthquake ground motions.

B. Combined ice and wind district loading

Three general degrees of district loading due to weather conditions are recognized and are designated as heavy, medium, and light loading. Figure 250-1 shows the districts where these loadings apply.

NOTE: The localities are classified in the different loading districts according to the relative simultaneous prevalence of the wind velocity and thickness of ice that accumulates on wires. Light loading is for places where little, if any, ice accumulates on wires.

Table 250-1 shows the radial thickness of ice and the wind pressures to be used in calculating loads. Ice is assumed to weigh 913 kg/m^3 (57 lb/ft^3).

C. Extreme wind loading

If no portion of a structure or its supported facilities exceeds 18 m (60 ft) above ground or water level, the provisions of this rule are not required, except as specified in Rule 261A1c, 261A2e, or 261A3d. Where a structure or its supported facilities exceeds 18 m (60 ft) above ground or water level the structure and its supported facilities shall be designed to withstand the extreme wind load associated with the Basic Wind Speed, as specified by Figure 250-2. The wind pressures calculated shall be applied to the entire structure and supported facilities without ice. The following formula shall be used to calculate wind load.

Load in newtons $= 0.613 \cdot (V_{m/s})^2 \cdot k_z \cdot G_{RF} \cdot I \cdot C_f \cdot A(m^2)$

Load in pounds $= 0.00256 \cdot (V_{mi/h})^2 \cdot k_z \cdot G_{RF} \cdot I \cdot C_f \cdot A(ft^2)$

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where

0.613 0.00256	Velocity-pressure numerical coefficient reflects the mass density of air for the standard atmosphere, i.e., temperature of 15 °C (59 °F) and sea level pressure of 760 mm (29.92 in) of mercury. The numerical coefficient 0.613 metric (0.00256 customary) shall be used except where sufficient climatic data are available to justify the selection of a different value of this factor for a design application. Ambient air density value, the constants 0.613, metric, and 0.00256, customary, reflects the mass density of air for the standard atmosphere, i.e., temperature of 15 °C (59 °F) and sea level pressure of 760 mm (29.92 in) of mercury
k_z	Velocity pressure exposure coefficient, as defined in Rule 250C1, Table 250-2
V	Basic wind speed, 3 s gust wind speed in m/s at 10 m (mi/h at 33 ft) aboveground, Figure 250-2
G_{RF}	Gust response factor, as defined in Rule 250C2
I	Importance factor, 1.0 for utility structures and their supported facilities
C_f	Force coefficient (shape factor). As defined in Rule 252B.
A	Projected wind area, m^2 (ft^2)

The wind pressure parameters (k_z, V, and G_{RF}) are based on open terrain with scattered obstructions (Exposure Category C as defined in ASCE 7-05). Exposure Category C is the basis of the NESC extreme wind criteria. Topographical features such as ridges, hills, and escarpments may increase the wind loads on site-specific structures. A Topographic Factor, K_{zt}, from ASCE 7-05, may be used to account for these special cases.

1. Velocity pressure exposure coefficient, k_z

   The velocity pressure exposure coefficient, k_z, is based on the height, h, to the center-of-pressure of the wind area for the following load applications:

   a. k_z for the structure is based on 0.67 of the total height, h, of the structure above ground line.

      NOTE: In Table 250-2, for h ≤ 75 m (250 ft), the structure k_z values are adjusted for the wind load to be determined at the center-of-pressure of the structure assumed to be at 0.67 h. The wind pressure is assumed uniformly distributed over the structure face normal to the wind.

   b. k_z for the wire is based on the height, h, of the wire at the structure.

      NOTE: In special terrain conditions (i.e., mountainous terrain and canyon) where the height of the wire aboveground at mid-span may be substantially higher than at the structure, engineering judgment may be used in determining an appropriate value for the wire k_z.

   c. k_z for a specific structure location or component is based on the height, h, to the center of pressure of the wind area being considered.

   The selected values of k_z are tabulated in Table 250-2. When h is > 75 m (250 ft), the formulas shall be used to determine a k_z value.

2. Gust response factor, G_{RF}

   Selected values of the structure and wire gust response factors are tabulated in Table 250-3. The structure gust response factor, G_{RF}, is determined using the total structure height, h. The wire gust response factor is determined using the height of the wire at the structure, h, and the design wind span, L. The structure and wire gust response factors may also be determined using the formulas in Table 250-3. For values of h > 75 m (250 ft) and L > 600 m (2000 ft) the G_{RF} shall be determined using the formulas in Table 250-3. In special terrain conditions (i.e., mountainous terrain and canyon) where the height of the conductor aboveground at mid-span

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may be substantially higher than at the attachment point, engineering judgment may be used in determining an appropriate value for the wire G_{RF}. Wire attachment points that are 18 m (60 ft) or less above ground or water level must be considered if the total structure height is greater than 18 m (60 ft) above ground or water.

When calculating a wind load at a specific structure location, the structure gust response factor, G_{RF}, determined using the total structure height, h, shall be used. The gust response factor, G_{RF}, to be used on components, such as antennas, transformers, etc., shall be the structure gust response factor.

D. Extreme ice with concurrent wind loading

If no portion of a structure or its supported facilities exceeds 18 m (60 ft) above ground or water level, the provisions of this rule are not required. Where a structure or its supported facilities exceeds 18 m (60 ft) above ground or water level, the structure and its supported facilities shall be designed to withstand the ice and wind load associated with the Uniform Ice Thickness and Concurrent Wind Speed, as specified by Figure 250-3. The wind pressures for the concurrent wind speed shall be as indicated in Table 250-4. The wind pressures calculated shall be applied to the entire structure and supported facilities without ice and to the iced wire diameter determined in accordance with Rule 251.

Ice is assumed to weigh 913 kg/m^3 (57 lb/ft^3).

1. For Grade B, the radial thickness of ice from Figure 250-3 shall be multiplied by a factor of 1.00.
2. For Grade C, the radial thickness of ice from Figure 250-3 shall be multiplied by a factor of 0.80.
3. The concurrent wind shall be applied to the projected area resulting from Rules 250D1 and 250D2 multiplied by a factor of 1.00.

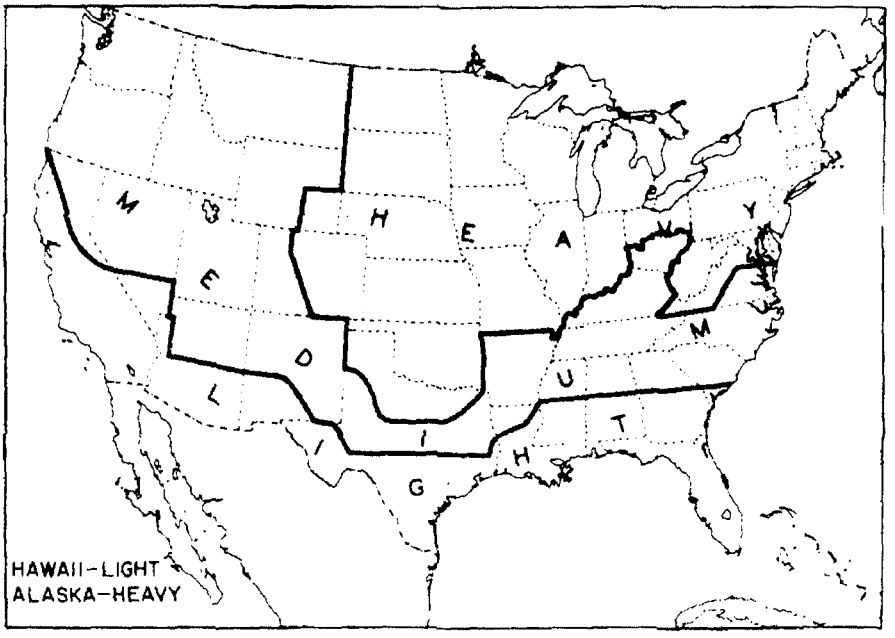

Figure 250-1—General loading map of United States with respect to loading of overhead lines

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NOTE: The localities are classified in the different loading districts according to the relative simultaneous prevalence of wind velocity and thickness of ice which accumulates on wires. Light loading is for places where little, if any, ice accumulates on wires.

Table 250-1 shows the minimum radial thicknesses of ice and the wind pressures to be used in calculating loadings. Ice is assumed to weigh 57 pounds per cubic foot.

Table 250-1. Ice and Wind Loads

	Loading district		
	Heavy	Medium	Light
Radial thickness of ice (in)	0.50	0.25	0
Horizontal wind pressure (lb/sq ft)	4	4	9

C. Extreme Wind Loading

Figure 250-2 is a wind map of the United States which shows the minimum horizontal wind pressures to be used for calculating loads upon tall structures. For wind pressure at a specific location use a value not less than that of the nearest pressure line. If any portion of a structure of supported facilities is located in excess of 60 feet above ground or water level, these wind pressures shall be applied to the entire structure and supported facilities without ice covering.

NOTE 1: The values of wind pressure given in Figure 250-2 represent the loading of wind upon cylindrical surfaces at 30 feet above ground level. They are based upon 50 year isotachs given in ANSI A58.1-1972, Building Code Requirements for Minimum Design Loads in Buildings and Other Structures, converted from miles per hour to pressure on cylindrical surfaces by the factor of 0.00256 times the square of the velocity.

NOTE 2: Wind velocity usually increases with height; therefore, experience may show that the wind pressures specified herein need to be further increased.

251. Conductor Loading

A. General

Ice and wind loads shall be as specified in Rule 250.

1. Where a cable is attached to a messenger, the specified loadings shall be applied to both cable and messenger.
2. In applying wind loadings to a bare stranded conductor or multiconductor cable, the assumed projected area shall be that of a smooth cylinder whose outside diameter is the same as that of the conductor or cable.

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Section 25. Loading for Grades B, C, and D

General Loading Requirements and Maps

A. General

1. It is necessary to assume the loadings which may be expected to occur on a line because of wind and ice during all seasons of the year. These weather loadings shall be the values of loading resulting from the application of Rules 250B or 250C. Where both rules apply, the required loading shall be the one that which, when combined with the appropriate overload capacity factors, has the greater effect on strength requirements.
2. Where construction or maintenance loads exceed those imposed by Rule 250A1, which may occur more frequently in light loading areas, the assumed loadings shall be increased accordingly.
3. It is recognized that loadings actually experienced in certain areas in each of the loading districts may be greater, or in some cases, may be less than those specified in these rules. In the absence of a detailed loading analysis, no reduction in the loadings specified therein shall be made without the approval of the administrative authority.

B. Combined Ice and Wind Loading

Three general degrees of loading due to weather conditions are recognized and are designated as heavy, medium, and light loading. Figure 250-1 shows the districts in the states in which these loadings are normally applicable.

NOTE: The localities are classified in the different loading districts according to the relative simultaneous prevalence of wind velocity and thickness of ice which accumulates on wires. Light loading is for places where little, if any, ice accumulates on wires.

Table 250-1 shows the radial thickness of ice and the wind pressures to be used in calculating loadings. Ice is assumed to weigh 57 pounds per cubic foot (913 kg/m^3).

C. Extreme Wind Loading

If any portion of a structure or its supported facilities exceeds 60 ft (18 m) above ground or water level, the applicable horizontal wind speed of Fig 250-2, as determined by the linear interpolation, shall be used to calculate horizontal wind pressures. These pressures shall be applied to the entire structure and supported facilities without ice loading. The following formulas shall be used to calculate wind pressures on cylindrical surfaces:

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pressure in $lbf/ft^2 = 0.00256 (v_{mi/h})^2$

pressure in pascals $= 0.613 (v_{m/s})^2$

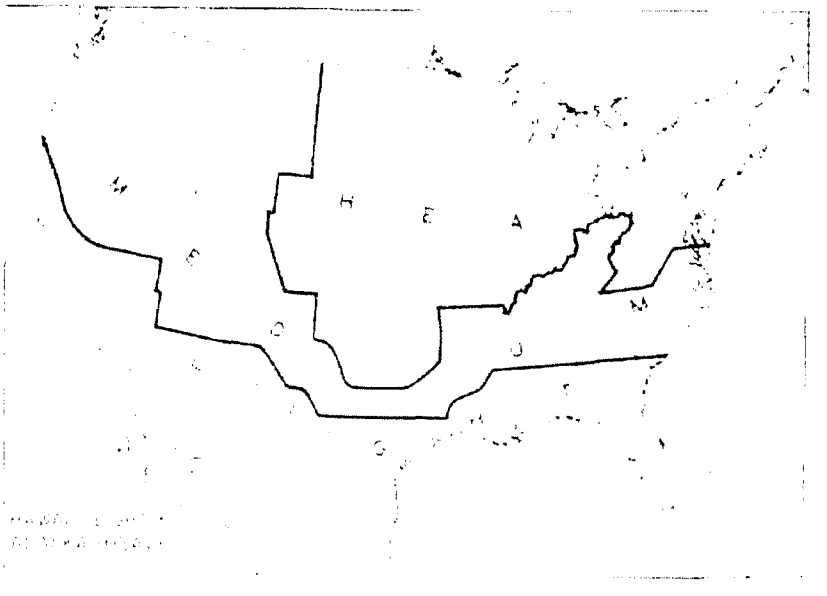
Table 250-2 lists the conversions of velocities to pressures for typical wind speeds as calculated by the formulas listed above.

If no portion of the structure or its supported facilities exceeds 60 ft (18 m) above ground or water level, the provisions of this rule are not required.

Fig 250-2 is a wind map of the contiguous United States and Alaska reproduced from ANSI A58.1-1982 [6]. For Hawaii and Puerto Rico, the basic wind speeds are 80 mi/h and 95 mi/h, respectively.

NOTE: Wind velocity usually increases with height; therefore, experience may show that the wind pressures specified herein need to be further increased.

Fig 250-1
General Loading Map of United States with Respect to Loading of Overhead Lines



SCANNED

Subcommittee Recommendation: Reject
Subcommittee Comment:
CP's 2766, 2673, and 2798 are rejected based on information obtained from public comments. Utility experience has demonstrated that electrical distribution and communication line structures, under 60 ft in height, are damaged during extreme wind events by trees, tree limbs, and other flying debris. Designing structures with heights less than 60 ft for extreme winds will increase pole strengths for distribution systems resulting in large increases in cost and design complexity without commensurate increase in safety. Safety of employees and the public is provided using the current NESC loading requirements.

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Items 3) and 4) offset each other in that the use of an alternate method for at least one code cycle (NESC-2007) would in fact allow the industry the luxury of obtaining the necessary experience, prior to the time when this may become the only allowable method in the NESC. This philosophy is also consistent with initially limiting the scope to one very important category (single-pole structures, etc.)—as per item 5)—during this interim period. While it is recognized that the alternate method may provide results different than the present method, this is inherent in any process that revises an important standard and should be accepted as inevitable. Nonetheless, the deliberate calibration of the proposed RBD method to past NESC practice assures that any such differences are minimized, corresponding to an evolutionary process in which the NESC is revised to reflect the latest technology.

Rule 250A1

CP 2766

Submitter

Donald Heald

Proposed Change

Remove the 60-ft exclusion from Grade B and Grade C construction and show a maximum wind load for Grade B and Grade C construction under 60 ft for Tables 253-1 and 253-2. Minor formatting changes of these tables is also suggested so the wording "Vertical Loads" will line up with "Transverse Loads" and "Longitudinal Loads." This change proposal is based a previously submitted change proposal which provides appropriate load factors for Grade C construction from Grade B construction under 250C wind loads (extreme wind). The proposed changes are shown below:

Table 253-1—Overload Factors for Structures,[1] Crossarms, Support Hardware, Guys, Foundations, and Anchors to Be Used with the Strength Factors of Table 261-1A

Overload Factors		
	Grade B	**Grade C**
Rule 250B Loads		
~~Vertical Loads~~	~~1.50~~	~~1.90~~[6]
Vertical Loads[3]	1.50	1.90[6]
Transverse Loads		
Wind	2.50	2.20[4]
Wire Tension	1.65[2]	1.30[5]
Longitudinal Loads		
At Crossings		
In general	1.10	No requirement
At deadends	1.65[2]	1.30[5]
Elsewhere		
In general	1.00	No requirement
At deadends	1.65[2]	1.30[5]
Rule 250C Loads	1.00[9]	1.00[7,8]

[7] For wind velocities above 100 mph (except Alaska), a factor of 0.75 may be used.

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Table 253-2—Alternate Overload Factors for Wood and Reinforced (Not Prestressed) Concrete Structures[1, 5] to Be Used with the Strength Factors of Table 261-1B

	Overload Factors			
	Grade B		Grade C	
	When Installed	At Replacement[2, 3]	When Installed	At Replacement[2, 3]
Rule 250B Loads				
~~Vertical Loads~~	~~2.20~~	~~1.50~~	~~2.20~~	~~1.50~~
Vertical loads[4]	2.20	1.50	2.20	1.50
Transverse loads				
Wind (at crossings)	4.00	2.67	2.67	1.33
Wind (elsewhere)	4.00	2.67	2.00	1.33
Wire tension	2.00	1.33	1.33	1.00
Longitudinal loads				
In general	1.33	1.00	No requirement	No requirement
At deadends	2.00[6]	1.33[7]	1.33	1.00
Rule 250C Loads	1.33[10]	1.00[10]	~~1.33~~ 1.00[9]	~~1.00~~ 0.87[8,9]

[8] For wind velocities above 100 mph (except Alaska) a factor of 0.75 may be used.

[9] ~~For wire attachments points that are 18 m (60 ft) or less above ground or water level and for structure height (h) under 60 ft, the wind pressures defined by $0.00256\ V^2 k_z G_{RF}$ need not exceed 15 psf~~ If no portion of the structure or its supported facilities exceeds 18 m (60 ft) above ground or water level, the wind pressure defined by $0.00256\ V^2 k_z G_{RF}$ times the overload factor need not exceed 15psf.

[10] ~~For wire attachments points that are 18 m (60 ft) or less above ground or water level and for structure height (h) under 60 ft, the wind pressures defined by $0.00256\ V^2 k_z G_{RF}$ need not exceed 30 psf~~ If no portion of the structure or its supported facilities exceeds 18 m (60 ft) above ground or water level, the wind pressure defined by $0.00256\ V^2 k_z G_{RF}$ times the overload factor need not exceed 22.5 psf.

Additional changes:

The following additional rules need to be changed to accommodate the above change:

1. Rule 250A.1:

250. General Loading Requirements and Maps

A. General

1. It is necessary to assume the wind and ice loads that may occur on a line. Two weather loadings are specified in Rules 250B and 250C. ~~Where both rules apply,~~ The required loading shall be the one that has the greater effect.

The removal of the 60-ft exclusion makes the wording "where both rules apply" no longer applicable. Both loading conditions apply at all times.

2. Rule 250C:

C. Extreme Wind Loading

~~If no potion of a structure or its supported facilities exceeds 18m (60 ft) above ground or water level, the provisions of this rule are not required except as specified in Rule 261A1c or Rule 261A2f. Where a structure of its supported facilities exceeds 18 m (60 ft) above ground or water level the~~ Structures

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and ~~its~~ their supported facilities shall be designed to withstand the extreme wind load associated with the Basic Wind Speed, as specified by Figure 250-2.

Reference to the 60-ft exclusion is no longer necessary.

3. Delete the last sentence to Rule 250C.2:

~~Wire attachment points that are 18m (60 ft) or less above ground or water level must be considered if the total structure height is greater than 18m (60 ft) above ground or water.~~

This sentence is moved to footnote 8 of Table 253-1 and footnote 9 of Table 253-2.

4. At the bottom of Tables 250-2, in the equations, replace the lower limits of 18 m and 60 ft with 10 m and 33 ft.

Reference to these heights are no longer needed.

5. Change Rule 261.A.1.c to read:

All structures ~~including those below 18 m (60 ft)~~ shall be designed to withstand, without conductors, the extreme wind load in Rule 250C applied in any direction on the structure.

The phrase "including those below 18 m (60 ft)" is no longer needed.

6. Change Rule 261.A.2.f to read:

All structures ~~including those below 18 m (60 ft)~~ shall be designed to withstand, without conductors, the extreme wind load in Rule 250C applied in any direction on the structure.

The phrase "including those below 18 m (60 ft)" is no longer needed.

Vote on Subcommittee 5 Recommendation

Affirmative: (14) Aichinger, Bingel, Clem, Denbrock, DeSantis, Freimark, Harrel, Heald, Kempner, Kinghorn, Peters, Rempe, Slavin, Standford

Negative: (7) Amato, Bullinger, Clapp, Hensel, Kluge, Shultz, Wong

Abstention: (0)

Explanation of Vote

Amato: I do not believe there is sufficient technical justification to remove the 60-ft exclusion.

Bullinger: 60-ft exclusion removal is not justified by data. Anecdotes are insufficient to justify the possible unintended consequences that could result. It is not clear that the 60-ft exclusion removal will improve safety. The calibration back to past practice is fraught with possible unintended consequences as illustrated by the discussions of the committee.

Clapp: I understand the desire to show a relative 2/3 relationship between Grade C and Grade B, but I think it should be achieved by raising the 15 psf limit to 20 psf (i.e., use 20 psf/30 psf) rather than reducing the 30 psf to 22.5 psf (i.e., 15/22.5).

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Slavin: This is an important proposal, providing the overall format for upgrading the strength and loading section consistent with the latest technical information, in a logical, integrated manner. Although somewhat controversial when originally proposed many code cycles ago, much of CP 2737 has already been incorporated into the NESC (e.g., the 3-second gust map of ASCE 7), agrees with the latest accepted standards and information (e.g., 50-year combined ice and wind map of ASCE 7-02), or is generally consistent with various other change proposals accepted by SC5 (e.g., extreme wind below 60 ft). It is recognized that CP 2737 does not treat extreme wind below 60 ft in exactly the same manner as the accepted CP, but it does provide significant load reduction for Grade C and/or sheltered environments. In any case, it is anticipated that CP 2737 would be modified, as appropriate, based upon public comments on the various CPs. Since CP 2737 is proposed as an "alternate method," it will allow the industry at least one code cycle to adjust to the new overall methodology. While an alternate method that produces dissimilar results may raise some short-term issues, this nonetheless represents the most practical procedure for introducing potentially significant changes into the NESC.

Wong: Many issues in the CP have already been taken care of by others. Also many other issues, such as structures below 60 ft, may have better foundation than CP 2766. However, the ice map is only for freezing rain. Tension limit (1.15 factor) has not been justified and could produce a totally different answer than Code (2002 NESC) requires currently. It should not be considered as "alternate method." Alternate methods should have equivalent results as the main method. AISC and ACI have done that.

Rule 250

CP 2673

Submitter

Allen Clapp

Proposed Change

Revise Rule 250C to eliminate the 60-ft exemption for application of extreme winds, as follows:

250. General Loading Requirements and Maps

A. General

1. It is necessary to assume the wind and ice loads that may occur on a line. Two weather loadings are specified in Rules 250B and 250C. ~~Where both rules apply,~~ The ~~the~~ required loading shall be the one that has the greater effect.
2. Where construction or maintenance loads exceed those imposed by Rule 250A1, which may occur more frequently in light loading areas, the assumed loadings shall be increased accordingly.
3. It is recognized that loadings actually experienced in certain areas in each of the loading districts may be greater, or in some cases, may be less than those specified in these rules. In the absence of a detailed loading analysis, no reduction in the loadings specified therein shall be made without the approval of the administrative authority.
4. The structural capacity provided by meeting the loading and strength requirements of Sections 25 and 26 provides sufficient capability to resist earthquake ground motions.

B. Combined Ice and Wind Loading

Three general degrees of loading due to weather conditions are recognized and are designated as heavy, medium, and light loading. Figure 250-1 shows the districts where these loadings apply.

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NOTE: The localities are classified in the different loading districts according to the relative simultaneous prevalence of the wind velocity and thickness of ice that accumulates on wires. Light loading is for places where little, if any, ice accumulates on wires.

Table 250-1 shows the radial thickness of ice and the wind pressures to be used in calculating loads. Ice is assumed to weigh 913 kg/m^3 (57 lb/ft^3).

C. Extreme Wind Loading

~~If no portion of a structure or its supported facilities exceeds 18 m (60 ft) above ground or water level, the provisions of this rule are not required, except as specified in Rule 261A1c or Rule 261A2f. Where a structure or its supported facilities exceeds 18 m (60 ft) above ground or water level the structure~~ Structures and ~~its~~ supported facilities shall be designed to withstand the extreme wind load associated with the Basic Wind Speed, as specified by Figure 250-2. The wind pressures calculated shall be applied to the entire structure and supported facilities without ice. The following formula shall be used to calculate wind load.

No further changes to the rule.

Supporting Comment

When the extreme wind loading requirements were added to the NESC in the 1977 edition, the predominant distribution pole length was still 35 ft. With a 6-ft setting depth, the top of the pole is 29 ft above ground. All conductors were located below the 10-m (33-ft) level used to take wind speed data. The structural failures caused by high winds on bare wires up to that time were only seen on transmission structures with larger conductor sizes. I do not recall any data on distribution line failures attributed to this phenomenon at that time. There was a general desire to exempt distribution facilities from the extreme wind calculations. The method chosen was to limit application of the extreme wind requirements in Rule 250C to those structures or supported facilities where one or both were more than 60 ft above ground.

Wind pressure is a function of the square of the wind speed. Wind force loading is a function of the pressure times the exposed area. With small wires and cables, the wind on ice-loaded cables and conductors required by Rule 250B (essentially a 40 mph wind) can produce a greater loading than an extreme wind loading for much of the nation. For larger wires and larger or overlashed cables, the extreme wind loading produces a higher loading, especially in areas subject to hurricane winds. As the size and number of cables and conductors on overhead lines grows, more distribution lines will experience a greater loading under extreme winds on bare facilities than lesser winds on ice-covered facilities.

Since the mid-1970s, CATV cables and additional and larger telephone and fiber optic cables have been installed on overhead lines and power distribution line conductors and cables have grown larger. As a result of heavier conductors and cables with greater sag and greater numbers of communication cables on overhead lines, the typical poles are taller and wider. It is not unusual for the standard pole length to be 40 or 45 ft; for some urban utilities, the standard distribution pole length is 50 ft. Whereas earlier facilities on 35-ft poles were located at lower levels and experienced slower wind speeds (wind speed increases with height), the conductors and cables suspended from these taller poles are located at the level where the wind data is taken or higher and do experience that level of wind. There is no longer any engineering justification for exempting the distribution facilities.

In earlier days, it was rare to find a pole loaded near its capacity. Today, it is not unusual to find poles loaded near capacity, particularly when alternative communication providers add extra cables, but also due to larger power conductors and cables. As a result, we are now beginning to see pole lines that can meet the traditional ice/wind loads of Rule 250B, but cannot meet extreme wind the loads of Rule 250C. I have personally inves-

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tigated pole line failure accidents where this has been the case.

It is past time to eliminate the exemption for distribution lines from consideration of extreme wind loads. If we do not, the failure rate will increase as more of the plant is installed with taller poles and heavier loading.

Subcommittee 5 Recommendation

Accept in principle. See action on CP 2766 on p. 390.

Vote on Subcommittee 5 Recommendation

Affirmative: (14) Aichinger, Bingel, Clapp, Clem, Denbrock, DeSantis, Freimark, Heald, Kempner, Peters, Rempe, Slavin, Standford, Wong

Negative: (6) Amato, Bullinger, Harrel, Hensel, Kluge, Shultz

Abstention: (1) Kinghorn

Explanation of Vote

Amato: I do not believe there is sufficient technical justification to remove the 60-ft exclusion.

Bullinger: 60-ft exclusion removal is not justified by data. Anecdotes are insufficient to justify the possible unintended consequences that could result. It is not clear that the 60-ft exclusion removal will improve safety. The calibration back to past practice is fraught with possible unintended consequences as illustrated by the discussions of the committee.

Hensel and *Harrel:* I am not in favor of removing the 60-ft exclusion.

Kluge: I prefer CP 2766 as modified.

Shultz: Removing the 60 ft exemption unilaterally will likely result in considerable increase in strength requirements in many loading situations, particularly in coastal areas. The public comments on a similar proposal for the 2002 revision cycle overwhelmingly cited collateral loading as the predominant cause of extreme wind failures. This proposal offers nothing to refute those statements of experience. In addition, in the 2002 cycle, several utilities in the South reviewed their records to see what claims for injury could be attributed to extreme wind failures. Those utilities could not identify any such claims for the previous several years. If this experience is anywhere near typical, the safety record is very good, and no support is provided in this proposal to demonstrate that removal of the exemption will improve on this safety performance.

Rule 250

CP 2802

Submitter

Clayton Clem

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an e-mail at rkluge@atcllc.com and ask for the NESC wind computation sheet. Your opinions of these proposals are extremely valuable to the NESC Subcommittee.

For your reference, there are several change proposals addressing wind load—CPs 2673, 2739, 2766, 2798, 2718, 2787.

Rule 250A1

CP 2798

Submitter

Donald Heald

Proposed Change

Remove the 60-ft exclusion from Grade B and Grade C construction and show a maximum wind load for Grade B and Grade C construction under 60 ft for Tables 253-1 and 253-2. Minor formatting changes of these tables are also suggested so the wording "Vertical Loads" would line up with "Transverse Loads" and "Longitudinal Loads." This change proposal is based on a previously submitted change proposal which provides appropriate load factors for Grade B and Grade C construction under Rule 250C loads (extreme wind). The proposed changes are shown below:

Table 253-1—Overload Factors for Structures,[1] Crossarms, Support Hardware, Guys, Foundations, and Anchors to Be Used with the Strength Factors of Table 261-1A

Overload Factors		
	Grade B	**Grade C**
Rule 250B Loads		
~~Vertical Loads~~	~~1.50~~	~~1.90[6]~~
Vertical Loads[3]	1.50	1.90[6]
Transverse Loads		
Wind	2.50	2.20[4]
Wire Tension	1.65[2]	1.30[5]
Longitudinal Loads		
At Crossings		
In general	1.10	No requirement
At deadends	1.65[2]	1.30[5]
Elsewhere		
In general	1.00	No requirement
At deadends	1.65[2]	1.30[5]
Rule 250C Loads	1.00[9]	1.00[7,8]

[7] For wind speeds above 100 mph (except Alaska), a factor of 0.75 may be used.
[8] For wire attachments points that are 18 m (60 ft) or less above ground or water level and for structure heights (h) under 60 ft, the wind pressures defined by $0.00256\ V^2\ k_z\ G_{RF}$ need not exceed 15 psf for locations where basic wind speeds [Figure 250-2(b)] are greater than 90 mph and 10 psf for 90 mph and less.
[9] For wire attachments points that are 18 m (60 ft) or less above ground or water level and for structure height (h) under 60 ft, the wind pressures defined by $0.00256\ V^2\ k_z\ G_{RF}$ need not exceed 30 psf.

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Table 253-2—Alternate Overload Factors for Wood and Reinforced (Not Prestressed) Concrete Structures[1, 5] to Be Used with the Strength Factors of Table 261-1B

	Overload Factors			
	Grade B		Grade C	
	When Installed	At Replacement[2, 3]	When Installed	At Replacement[2, 3]
Rule 250B Loads				
~~Vertical Loads~~	~~2.20~~	~~1.50~~	~~2.20~~	~~1.50~~
Vertical loads[4]	2.20	1.50	2.20	1.50
Transverse loads				
Wind (at crossings)	4.00	2.67	2.67	1.33
Wind (elsewhere)	4.00	2.67	2.00	1.33
Wire tension	2.00	1.33	1.33	1.00
Longitudinal loads				
In general	1.33	1.00	No requirement	No requirement
At deadends	2.00[6]	1.33[7]	1.33	1.00
Rule 250C Loads	1.33[10]	1.00[10]	~~1.33~~ 1.00[9]	~~1.00~~ 0.87[8,9]

[8] For wind speeds above 100 mph (except Alaska), a factor of 0.75 may be used.
[9] For wire attachments points that are 18 m (60 ft) or less above ground or water level and for structure height (h) under 60 ft, the wind pressures defined by $0.00256\ V^2\ k_z\ G_{RF}$ need not exceed 15 psf for wind velocities greater than 90 mph and 10 psf for wind velocities 90 mph and less.
[10] For wire attachments points that are 18 m (60 ft) or less above ground or water level and for structure height (h) under 60 ft, the wind pressures defined by $0.00256\ V^2\ k_z\ G_{RF}$ need not exceed 30 psf.

Additional changes:

The following additional rules need to be changed to accommodate the above change:

1. Rule 250A1:

250. General Loading Requirements and Maps

1. It is necessary to assume the wind and ice loads that may occur on a line. Two weather loadings are specified in Rules 250B and 250C. ~~Where both rules apply.~~ The required loading shall be the one that has the greater effect.

The removal of the 60-ft exclusion makes the wording "where both rules apply" no longer applicable. Both loading conditions apply at all times.

2. Rule 250C:

C. Extreme Wind Loading
~~If no potion of a structure or its supported facilities exceeds 18m (60 ft) above ground or water level, the provisions of this rule are not required except as specified in Rule 261A1e or Rule 261A2f. Where a structure of its supported facilities exceeds 18 m (60 ft) above ground or water level the~~ Structures and ~~its~~ their supported facilities shall be designed to withstand the extreme wind load associated with the Basic Wind Speed, as specified by Figure 250-2.

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Subcommittee 5 Recommendation

Accept in principle. See action on CP 2766 on p. 390.

Vote on Subcommittee 5 Recommendation

Affirmative: (13) Aichinger, Clapp, Clem, Denbrock, DeSantis, Freimark, Heald, Hensel, Kempner, Peters, Rempe, Slavin, Wong

Negative: (7) Amato, Bingel, Bullinger, Harrel, Kluge, Shultz, Standford

Abstention: (1) Kinghorn

Explanation of Vote

Amato: I do not believe there is sufficient technical justification to remove the 60-ft exclusion.

Bingel: This CP follows CP 2766 which already passed in eliminating the 60-ft exclusion for extreme wind. However, CP 2798 adds an additional cap for Grade C wind pressure. This only applies to regions in the country where the extreme wind speed is 90 mph or less. By not accepting this CP, the load requirement for Grade C construction in the medium load district will increase. No proof was presented to justify this load increase. A few subcommittee members expressed feeling that the load should be higher. That's not reason enough to reject this CP.

Bullinger: 60-ft exclusion removal is not justified by data. Anecdotes are insufficient to justify the possible unintended consequences that could result. It is not clear that the 60-ft exclusion removal will improve safety. The calibration back to past practice is fraught with possible unintended consequences as illustrated by the discussions of the committee.

Harrel: I am not in favor of the removal of the 60-ft exclusion.

Shultz: I prefer to keep the 60-ft exemption, but if it is removed, I prefer CP 2798 rather than CP 2766, which was accepted. I do support the same revisions to the footnotes in CP 2798 as were made in CP 2766. The 10 psf cap for Grade C continental extreme winds is reasonably comparable to present loading requirements for structures 60 ft and less in height which have served well.

Standford: I feel that the cap of 10 psf (62.5 mph) is too low for extreme wind and believe that it should be 15 psf as it is in CP 2677.

Wong: CP 2766 has higher requirements to Grade C construction located at medium load district. CP 2798 footnote 8 is written to address this issue. 10 psf wind pressure is more closely related to current 2002 NESC requirements. Yet, is 10 psf (60 mph plus) adequate? We need Code user input.

Kluge: I prefer CP 2739 as long as the district loads remain. The present district loads provide adequate strength for structures <= 60 ft tall.

I encourage you to evaluate the impact of this proposal on your current designs. To assist you, I have calculated the wind pressure for a typical 40 ft distribution pole, buried 6 ft, with phase conductors at the top, neutral conductors 8 ft below the phases, and communication cables located 3-1/2 ft below the neutral, and have displayed the results in the following table. Look at the pressure associated with the wind speed that represents your service territory.

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Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: E. J. Battaglia
Exhibit No. ____ (EJB-1)
Schedule 1

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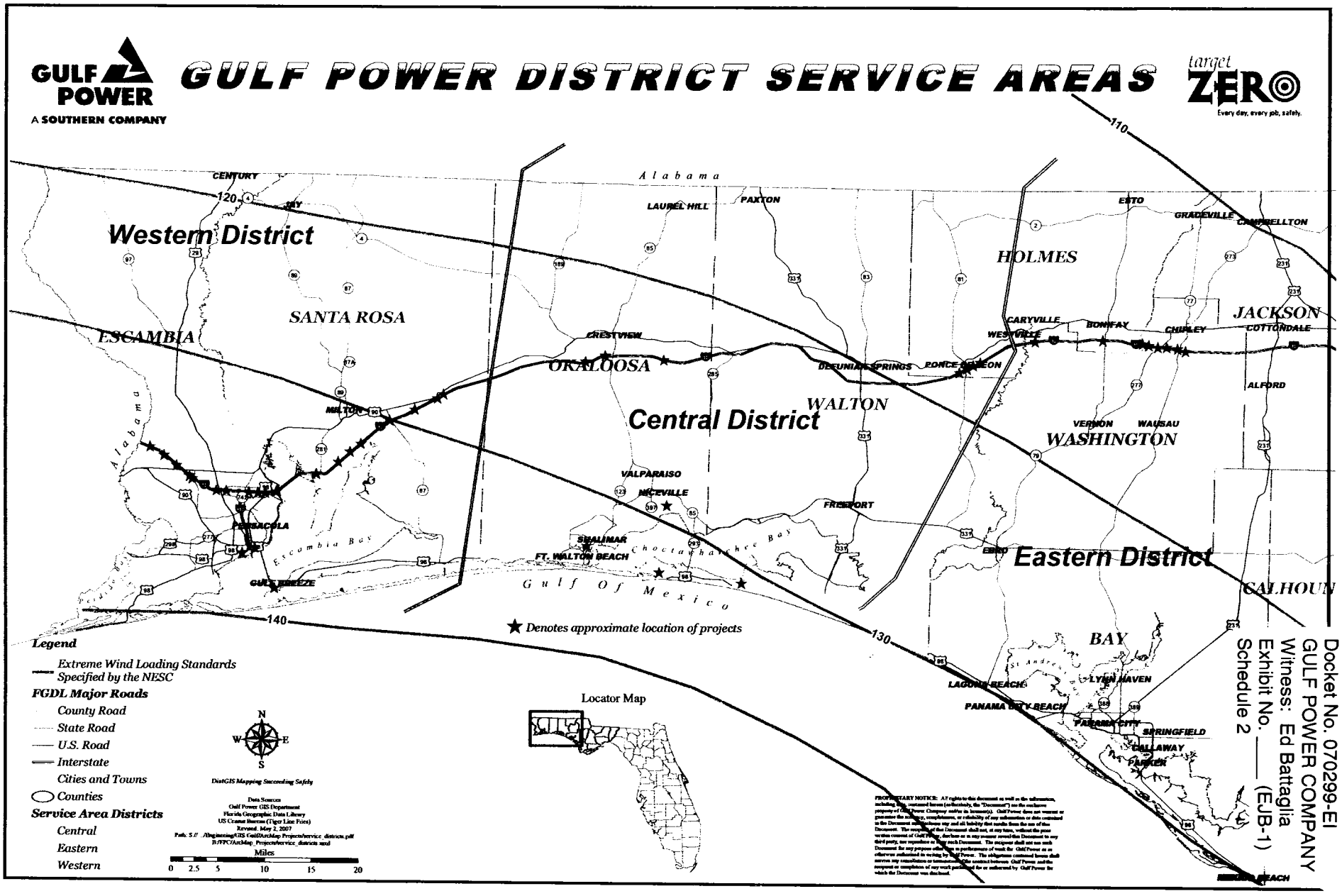
FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI EXHIBIT 18
COMPANY Gulf (Direct)
WITNESS Edward J. Battaglia (EJB-1)
DATE 10/02-03/07



Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
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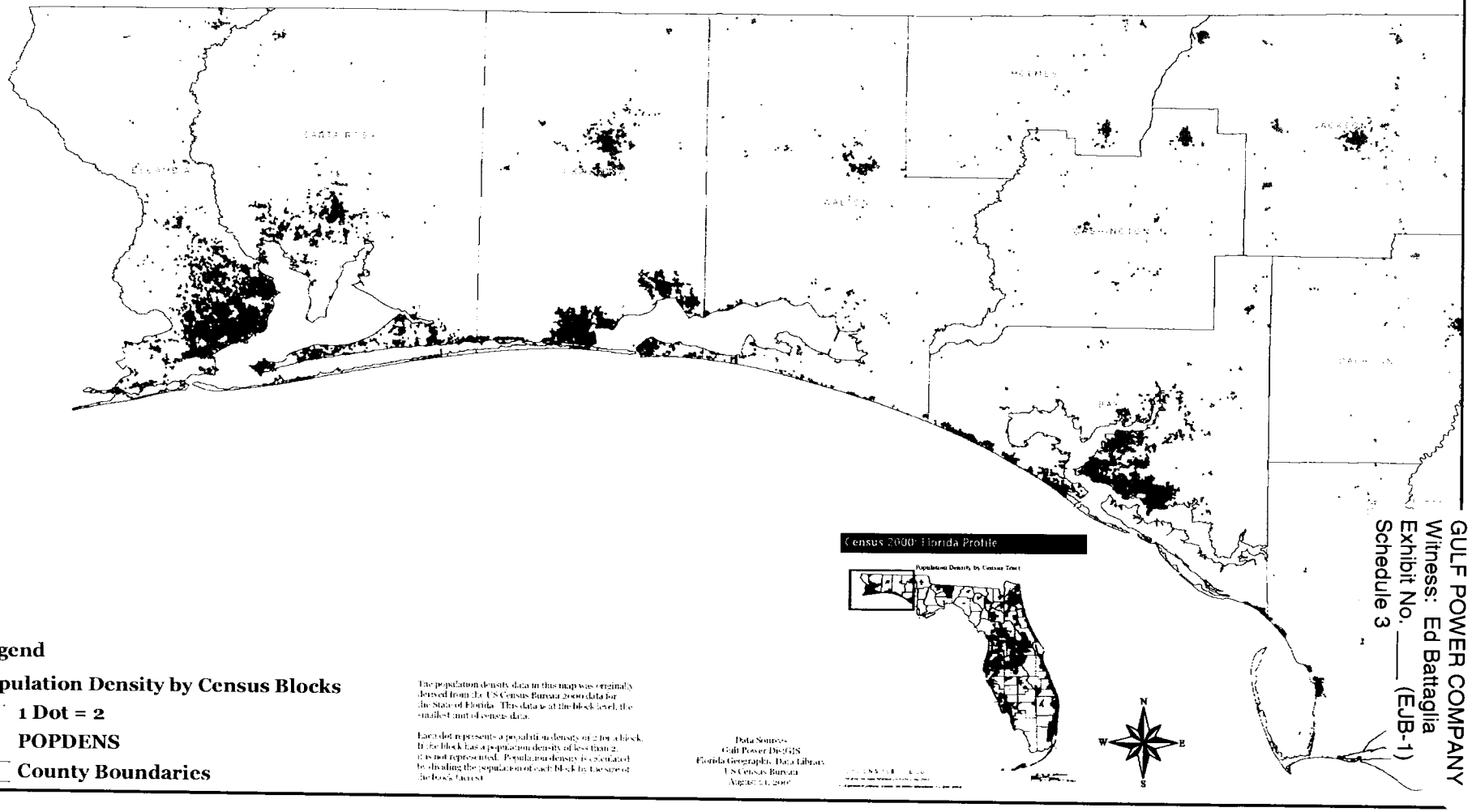
Exhibit No. ____ (EJB-1)
Schedule 2

GULF POWER
A SOUTHERN COMPANY

Population Density of Northwest Florida by Census Blocks

target ZERO
Every day, every job, safely



Legend

Population Density by Census Blocks

1 Dot = 2

POPDENS

County Boundaries

The population density data in this map was originally derived from the US Census Bureau 2000 data for the State of Florida. This data is at the block level, the smallest unit of census data.

Each dot represents a population density of 2 for a block. If a block has a population density of less than 2, it is not represented. Population density is calculated by dividing the population of each block by the size of the block (acres).

Data Sources:
Gulf Power DecGIS
Florida Geographic Data Library
US Census Bureau
August 21, 2007

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: Ed Battaglia
Exhibit No. ____ (EJB-1)
Schedule 3

Rule 25-6.0342 - **Gulf Power Company Storm Hardening Plan**

	Activity	Docket No.	Actual/Estimated Utility Costs						Estimated Benefits to Utility Customers: Impact on Storm Restoration Costs			Estimated Benefits to Utility Customers: Impact on Storm Caused Outages - avoided CMI			Other Estimated Company Benefits			Estimated Benefits to Third Party Attachers: Impact on Storm Restoration Costs			Estimated Benefits to Third Party Attachers: Impact on Storm Caused Outages		
			2004	2005	2006	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009	2007	2008	2009
(a)	**Wooden Pole Inspections.**	060078-EI	$288,109	$988,971	$595,146	$830,000	$850,000	$850,000	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
	Ten Storm Hardening Initiatives.	060198-EI																					
(b)	1 A Three-Year Vegetation Management Cycle for Distribution Circuits		$2,821,245	$3,617,018	$2,180,416	$4,638,139	$4,907,005	$4,906,189	$500,000	$500,000	$500,000	4,425,000	8,850,000	13,275,000	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
(c)	2 An Audit of Joint-Use Attachment Agreements	See Note 6	$0	$0	$0	$384,000	$420,000	$460,000	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
(d)	3 A Six-Year Transmission Structure Inspection Program		$330,974	$78,346	$245,181	$475,552	$481,335	$485,086	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 12	See Note 12	See Note 12	See Note 12	See Note 12	See Note 12
(e)	4 Hardening of Existing Transmission Structures		$1,797,840	$2,052,497	$1,829,361	$3,900,000	$3,000,000	$3,000,000	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 12	See Note 12	See Note 12	See Note 12	See Note 12	See Note 12
(f)	5 Transmission and Distribution GIS		$0	$0	$0	$75,000	$75,000	$75,000	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
(g)	6 Post-Storm Data Collection and Forensic Analysis	See Note 5	$0	$0	$0	$205,000	$100,000	$100,000	0	0	See Note 5	See Note 7	See Note 7	See Note 7	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
(h)	7 Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems		$0	$0	$0	$0	$0	$0	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
(i)	8 Increased Utility Coordination with Local Governments		$0	$0	$0	$0	$0	$0	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
(j)	9 Collaborative Research on Effects of Hurricane Winds and Storm Surge		$0	$0	$0	$15,000	$17,000	$17,000	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
(k)	10 A Natural Disaster Preparedness and Recovery Program		$0	$0	$0	$0	$0	$0	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
	Compliance with National Electric Safety Code's adoption of Extreme Wind Loading Standards.	070xxx-EI																					
(l)	1 New Distribution Facilities - incremental	See Note 8	0	0	0	$30,400	$121,500	$121,500	$611,891	$611,891	$611,891	35,975	35,975	35,975	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
	Base amount		$4,583,494	$4,995,443	$5,594,281	$4,558,770	$4,152,510	$4,145,850	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
(m)	2 Major planned expansion, rebuild, or relocation of distribution facilities	See Note 8	0	0	0	$25,900	$103,500	$103,500	$510,241	$510,241	$510,241	30,646	30,646	30,646	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
	Base amount		$2,802,490	$3,884,056	$4,930,651	$2,159,000	$3,978,000	$4,108,000	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
(n)	3 Critical infrastructure and major thoroughfares	See Note 10	0	0	0	$523,610	$499,229	$563,479	$271,180	$254,800	$293,020	23,095	21,700	24,955	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
	Wind Monitors to provide needed wind data		0	0	0	$43,000	$36,000	$45,000	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 2	See Note 2	See Note 2	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
	Mitigating flood and storm surge damage to underground and supporting overhead facilities.	070xxx-EI																					
(o)	1 Transmission		See Note 3																				
(p)	2 Distribution - piloted project incremental costs	See Note 4	$0	$71,680	$446,000	$181,000	$100,000	$100,000	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4	See Note 4	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
	Distribution - use of SS equipment	See Note 9	$993,555	$1,057,308	$1,380,338	$1,143,733	$1,143,733	$1,143,733	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 7	See Note 4	See Note 4	See Note 4	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11	See Note 11
(q)	**Placement of new and replacement distribution facilities to facilitate safe and efficient access for installation and maintenance.**	070xxx-EI	See Note 1																				
	TOTALS		$13,617,707	$16,745,319	$17,201,374	$19,218,504	$20,106,312	$20,345,837	$1,893,312	$1,876,932	$1,915,152	4,514,716	8,938,321	13,366,576									

SH Cost per customer using 2006 YE customers of 418,892 **$46 per customer**

Notes:

1 Gulf has always recognized that accessibiy to distribution facilities is essential to safe and efficient maintenance and storm restoration. Since this activity is already integral to our construction practices, there is no added cost impact nor can these costs be determined. There is no incremental cost impact or benefits associated with this activity.

2 Until the program is complete and a storm hits it is not possible to estimate benefits resulting from this activity.

3 Gulf does not have underground transmission/substation facilities.

4 Gulf recognized and piloted underground system storm hardening design changes in response to lessons learned from Ivan in 2004. Gulf has not determined a methodology at this time for determining the benefits of undergrounding in coastal areas as a storm hardening technique.

5 Cost for 2007 includes setting up the computer code, the database, and testing. Post storm forensic data collection and analysis will initially increase the cost of the storm due to cost associated with collection and analysis of data. System storm hardening improvements identified through data analysis will not occur until improvements can be budgeted the year after the storm strikes and implemented during the year in which they are budgeted. This time lag for initiating system improvements will be approximately two years after a storm strike. Cost fo Forensic data collection will vary greatly depending on the size of the storm and extent of storm damage.

6 Gulf performs these audits every five years across the system, therefore no dollars are shown for 2004 to 2006.

7 It is not possible to estimate benefits at this time.

8 Transitioning to Grade B construction.

9 Gulf has historically used stainless steel transformers within coastal areas which mitigates damage after a storm surge. Estimates for 07, 08, and 09 based on 3 year average of actuals.

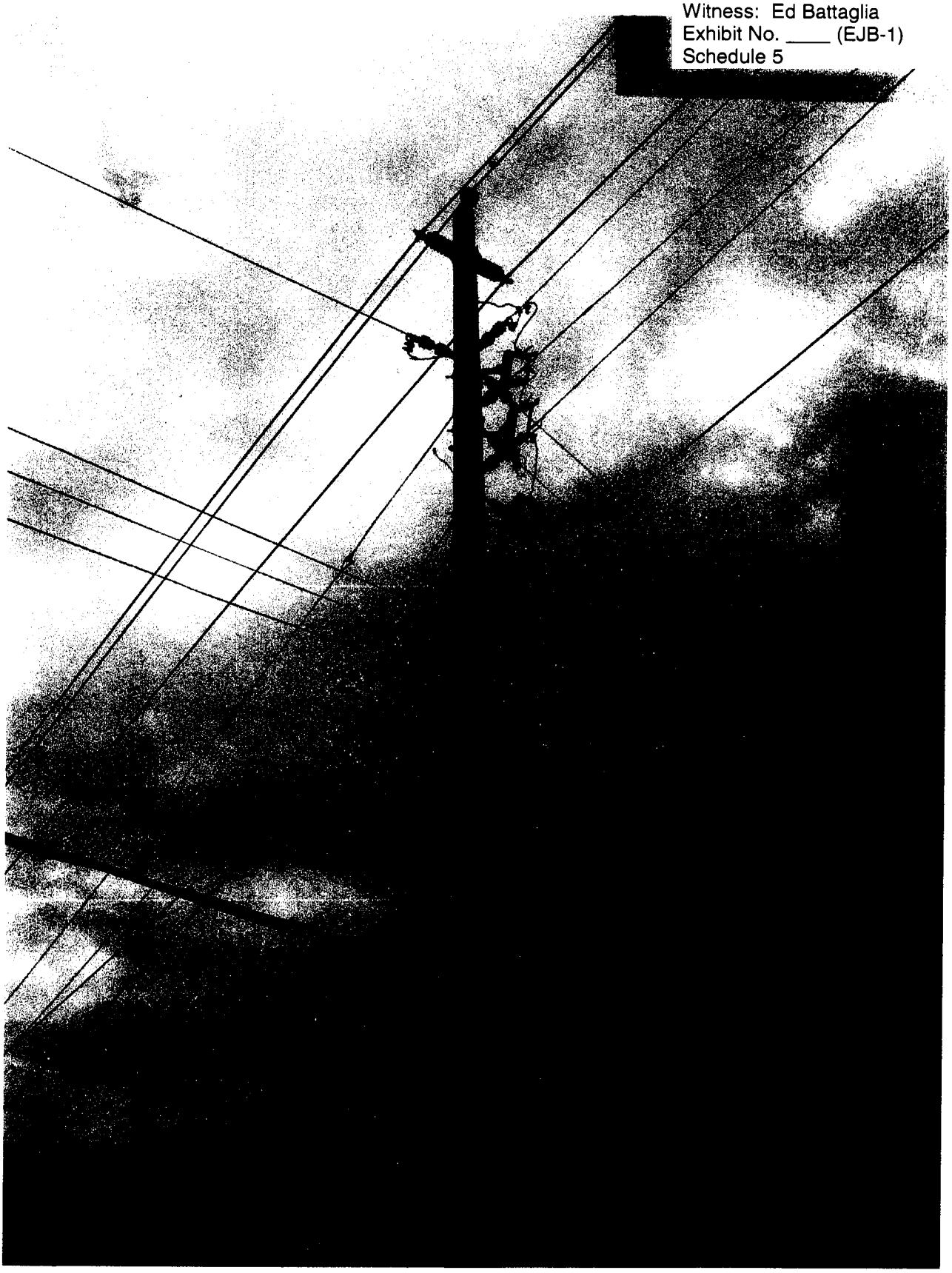
10 Applying Extreme Wind Loading to targeted projects.

11 Estimates to be determined and provided by Third Party Attachers.

12 There are no Third Party Attachers on transmission structures.

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: Ed Battaglia
Exhibit No. ——— (EJB-1)
Schedule 4

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: Ed Battaglia
Exhibit No. ____ (EJB-1)
Schedule 5



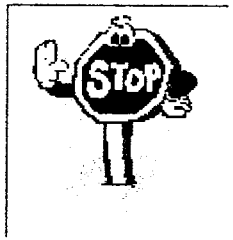
Pole Loading Analysis

Pole Loading Percentage

Pole Size 60/3 Grade B

Horizontal Loading 250C

Vertical Loading 3% 250C



Print

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Graphs

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Span Guy Strand Data

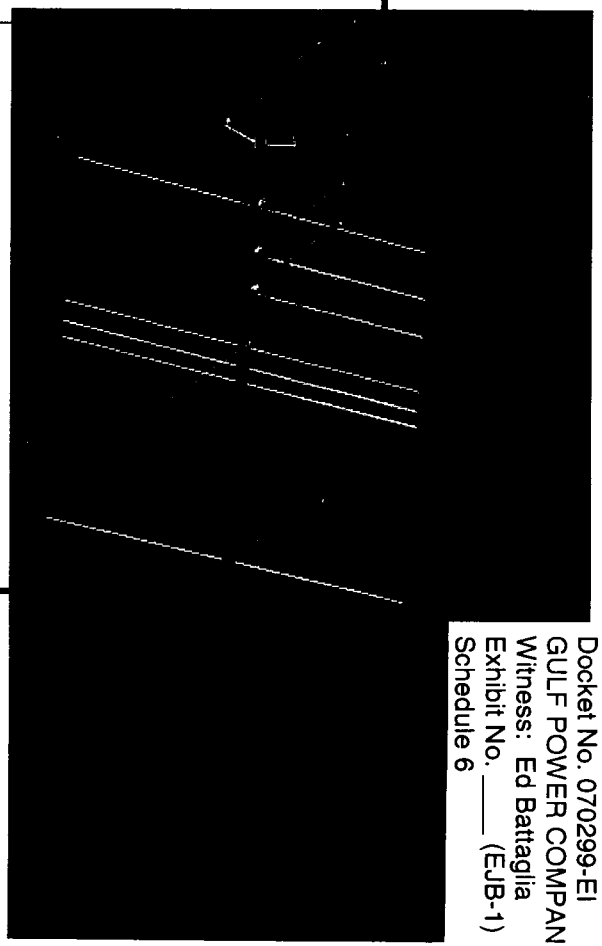
Span Number	Strand Size	Strand Tension	Attach Height	Span Length	Span Direction	Strand Strength	Strand Loading
3	3/8" UG	3,435	108"	373'	0°	10,350	33%
3	3/8" UG	2,178	150"	373'	0°	10,350	21%
3	3/8" UG	827	382"	373'	0°	10,350	8%

Arm / Bracket Data

Arm/Bracket	Attach	Vert Loading	Horz Loading
18" Steel PTP	8"	5%	34%
26" 10 FG 2.0"	32"	26%	29%
26" 10 FG 2.0"	32"	26%	29%
Spool Rack	208"		

Insulator Data

Insulator	Attach	Loading	Angle
15KV Pin	8"	72%	0°
15KV Pin	32"	72%	0°
15KV Pin	32"	72%	0°
15KV Dead End	90"	16%	0°

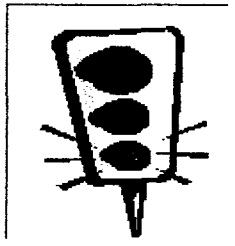


Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: Ed Battaglia
Exhibit No. ____ (EJB-1)
Schedule 6

Pole Loading Analysis

Pole Loading Percentage

Pole Size	60/3	Grade B
Horizontal Loading	71%	250C
Vertical Loading	9%	250C



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Guy Strand Data

Anchor Number	Strand Size	Strand Tension	Strand Strength	Attach Point	Lead Length	Guy Direction	Strand Loading	NESC Rule
1	3/8" UG	7,669	10,350	100"	20'	269°	74%	250C

Span Guy Strand Data

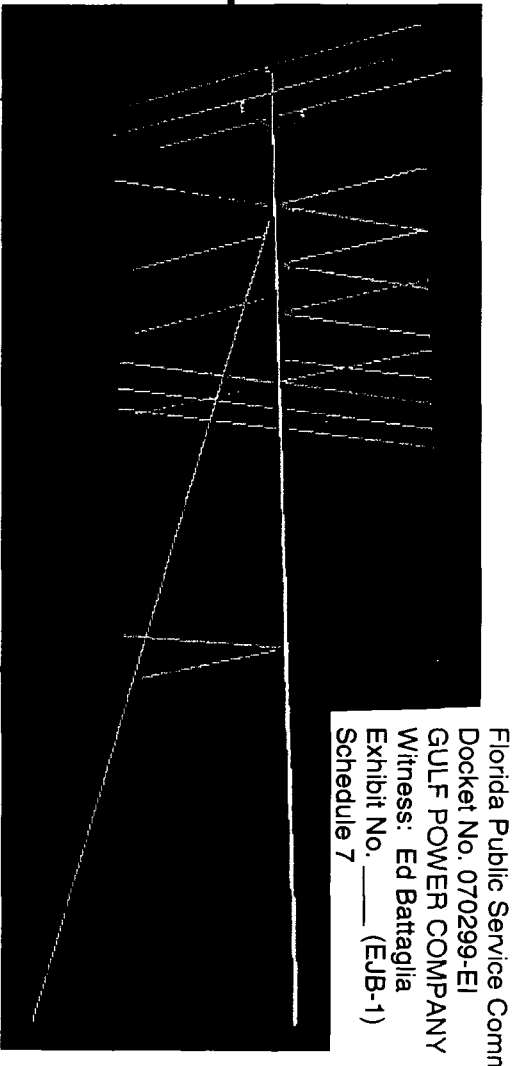
Span Number	Strand Size	Strand Tension	Attach Height	Span Length	Span Direction	Strand Strength	Strand Loading
3	3/8" UG	3,030	108"	166'	0°	10,350	29%
3	3/8" UG	1,558	150"	166'	0°	10,350	15%
3	3/8" UG	1,150	382"	166'	0°	10,350	11%
6	3/8" UG	3,949	192"	85'	90°	10,350	38%

Anchor Data

Anchor Number	Rod Tension	Rod Strength	Rod Size	Anchor Strength	Soil Class	Anchor Type
1	7,669	58,000	1-1/4" Rod	8,000	Class - 7	10" Single Heli

Arm / Bracket Data

Arm/Bracket	Attach	Vert Loading	Horz Loading



Solution for example shown. In order to meet 140MPH. The modifications include the following:

1) set 2 additional poles to shorten the span to the north and the span to the south
2) add 1 additional anchor to the West.
3) add one span guy to the east and an anchor.

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: Ed Battaglia
Exhibit No. ____ (EJB-1)
Schedule 7

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: Ed Battaglia
Exhibit No. ____ (EJB-1)
Schedule 8

Hurricane Direct Hits on NW Florida
1851 to 2006
Data Source NOAA

Area	CAT 1 Winds 74-94 mph	CAT 2 Winds 96-110 mph	CAT 3 Winds 111-130 mph	CAT 4 Winds 131-155 mph	CAT 5 Winds >155 mph	ALL	Major Hurricanes
NW Florida	27	16	12	0	0	55	12
Percentage of Total	49%	29%	22%	0%	0%	-	22%

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: Ed Battaglia
Exhibit No. ____ (EJB-1)
Schedule 9

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: Ed Battaglia
Exhibit No. ____ (EJB-1)
Schedule 10

Summary of Extreme Wind Loading Projects by Year

2007	District	Critical Load	Feeder ID	Total Main Miles	Estimated Cost
	Central	Hospital	8162	0.27	$34,038
	Eastern	I-10 Crossings	Various	N.A.	$52,000
	Central	I-10 Crossings	Various	N.A.	$45,500
	Western	Sewage Plant	5912	0.37	$46,645
	Western	Sewage Plant	7402	1.36	$171,453
	Western	Fuel Depot	6522	1.38	$173,974
TOTAL 2007					$523,610
2008	**District**	**Critical Load**	**Feeder ID**	**Total Main Miles**	**Estimated Cost**
	Central	Hospital	9132	1.13	$142,457
	Central	Fuel Depot	9252	2.83	$356,772
TOTAL 2008					$499,229
2009	**District**	**Critical Load**	**Feeder ID**	**Total Main Miles**	**Estimated Cost**
	Western	Hospital	7512 & 7522	1.06	$133,633
	Central	Sewage Plant	9342	2.43	$306,346
	Western	I-10 Crossings	Various	N.A.	$123,500
TOTAL 2009					$563,479
	Company	Three Year Plan Totals			$1,586,318

Storm Hardening Plan
Gulf and FCTA Input Timeline (2007)

Date	Activity
2/23	FCTA Request to Participate in Gulf's Storm Hardening Plan
3/20	Preliminary FCTA comments sent to Gulf
3/29	Draft 1 of Gulf's Storm Hardening Plan sent (Fedex) to FCTA
4/9	Draft 2 of Gulf's Storm Hardening Plan sent (Fedex) to FCTA
4/13	Conference Call with FCTA From FCTA: Beth Keating and 7 others Beggs & Lane: Russell Badders Gulf Power: Alan McDaniel, Ed Battaglia, and Jerry Mintz
4/19	Draft 3 of Gulf's Storm Hardening Plan sent (Fedex) to FCTA
4/27	FCTA written comments to Gulf on drafts of the Storm Hardening Plan
4/30	Gulf emailed revised Attachment Standards and additional details of the draft Storm Hardening Plan to FCTA
5/2	FCTA's preliminary cost & benefit analysis received
6/14	FCTA Petition to Intervene filed (no objection filed by Gulf)
7/13	Detailed Maps of Gulf's EWL Projects emailed to FCTA
7/18	FPSC Workshop #1 with FCTA and other attachers
7/20	Maps of poles to be included in the 2007 Pole Strength & Loading Analysis sent to FCTA

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI EXHIBIT 19
COMPANY Gulf (Direct)
WITNESS Alan G. McDaniel (AGM-1)
DATE 10/02-03/07

Date	Activity
7/23	Meeting with FCTA at Gulf Power headquarters in Pensacola From FCTA: Beth Keating, Maria Browne, and M.T. Harrelson Cox Communications: Mark O'Ceallaigh and Michael Cantwell ComCast: Tom Carroll Beggs & Lane: Russell Badders Balch Bingham: Eric Langley Gulf Power: Alan McDaniel and Jerry Mintz
7/24	Received e-mail from Mr. Harrelson with comments: FCTA requesting input into safety audit and strength assessment guidelines
7/25	FPSC Workshop #2 with FCTA and other attachers
8/1	FPSC Workshop #3 with FCTA and other attachers
8/7	Conference Call with FCTA From FCTA: Maria Browne, Beth Keating, and M.T. Harrelson Cox Communications: Michael Cantwell Beggs & Lane: Russell Badders Balch Bingham: Eric Langley Gulf Power: Alan McDaniel and Jerry Mintz
8/14	Amended Storm Hardening Plan filed with the FPSC (Based on comments from FPSC Staff and third-party attachers)

FPL
2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN

FILED
MAY 7, 2007
RULE 25-6.0342 F.A.C

EXHIBIT MBM-1

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI EXHIBIT 20
COMPANY FPL (Direct)
WITNESS Manuel B. Miranda (MBM-1)
DATE 10/02 + 03/07

Docket No. 070301-EI
FPL Storm Hardening Plan
Exhibit MBM-1 Page 2 of 223

Florida Power & Light Company

Electric Infrastructure Storm Hardening Plan

(Rule 25-6.0342, F.A.C.)

May 7, 2007

Florida Power & Light Company
Electric Infrastructure Storm Hardening Plan

EXECUTIVE SUMMARY

The 2004 and 2005 hurricane seasons were the most extraordinary and challenging on record for FPL and its customers. Five direct landfalls and two indirect impacts in the service territory, resulting in significant customer outages and requiring extraordinary efforts to rebuild and restore the electric infrastructure compels us to examine and evaluate the facts from this experience. A change in design, construction and operation of the electrical system infrastructure is indicated as we face, according to forecasters, two decades of heightened tropical cyclonic activity.

On January 30, 2006, FPL responded to this challenge by filing its Storm Secure Plan with the Florida Public Service Commission (FPSC). This comprehensive plan for increased storm preparedness included the following four areas: hardening the electric network; investing in underground conversions; modifying the pole inspection program; and enhancing vegetation management activities. The FPSC has subsequently approved FPL's plan for:

- 8 year distribution and 6 year transmission pole inspection cycles
- continue a three year average cycle for feeders, implement a six year average tree trimming cycle for lateral circuits, and trim all circuits serving critical customers before each storm season
- a Governmental Adjustment Factor (GAF), 25% investment, to promote applicable local government sponsored overhead to underground conversions.

On February 1, 2007, the FPSC adopted Rule 25-6.0342 which directs FPL and other investor owned utilities to file detailed electric infrastructure hardening plans by May 7, 2007. This document contains FPL's detailed plan.

Two key conclusions drawn by FPL from the 2004 and 2005 storms experience and FPL forensic data analysis form the basis for the FPL plan. They are that:

1. For Hurricane Wilma, wind was the predominant root cause of distribution pole breakage.
2. FPL's transmission poles, which are already built to the National Electrical Safety Code (NESC) extreme wind loading criteria (EWL), performed well overall.

Although no electrical system can be made fully resistant to hurricane impacts, we believe that FPL's proposed hardening plan will mitigate the impact of future storms. The following highlights FPL's proposed hardening plan for its distribution system:

- Implement a three prong approach for distribution infrastructure hardening. The three prongs, each of which serves a different purpose under the plan, are EWL; Incremental Hardening, and Design Guidelines. This approach will allow FPL to begin obtaining hardening benefits across our entire service territory promptly and cost-effectively.
- Apply EWL to existing and new feeders (main distribution lines) as well as any associated laterals directly serving Critical Infrastructure Facilities (CIF) (i.e., critical customers such as hospitals and 911 centers, and certain poles critical to operations and efficient restoration). Feeders are the backbone and therefore a critical component of FPL's overhead distribution system. Feeder performance can have a substantial impact on the overall service reliability to our customers.
- Apply Incremental Hardening to certain existing feeders so that, with targeted cost-effective modifications, the entire feeders' wind profile can be increased, up to and including EWL. Initially, Incremental Hardening will focus on "community projects", meaning feeders serving essential community needs such as grocery stores, gas stations and pharmacies.
- Implement system-wide FPL Design Guidelines containing criteria which will apply EWL to the design and construction of all new overhead facilities, major planned work, relocation projects, as well as daily work activities. These guidelines primarily are associated with changes in pole class, pole type and desired span lengths.

FPL's filing also includes information regarding research and development projects and initiatives being pursued in order to identify new ways of strengthening our electrical infrastructure. These initiatives include seeking out and evaluating new products, work methods, and construction techniques. This also includes collaborative research efforts with the Public Utility Research Center (PURC), where initial focus areas are undergrounding, wind testing and vegetation management.

In 2007, FPL plans to utilize EWL to harden 34 feeders and any associated laterals directly serving 28 CIF customers. Additionally, FPL plans to EWL harden Critical Poles in 43 highway crossings of I-75 and the Florida Turnpike, as well as 78 additional Critical Poles at locations elsewhere in the service territory. FPL plans to apply Incremental Hardening to feeders associated with 34 community projects. In total, the proposed 2007 deployment plan corresponds to approximately 145 overhead circuit miles. FPL estimates its 2007 expenditures will range from $40 - $70 million. These

estimates are based upon current work methods, products, and equipment and assume the necessary resources will be available to execute the plan.

FPL has not yet finalized hardening plans for 2008 and 2009. At this time, our preliminary 2008 and 2009 plans propose hardening an additional 80 -150 feeders each year, impacting approximately 300-600 miles per year. Costs are estimated at this time to be $75 - $125 million in 2008 and $100 - $150 million in 2009.

As noted, FPL's transmission system is already built to EWL standards and performed well in the 2004 and 2005 storm seasons. However to further improve its transmission and substation system, FPL has commenced the replacement of single pole un-guyed wood transmission structures and ceramic post insulators on concrete poles to meet higher, more current design standards. Replacing them has previously been approved by the Commission as part of FPL's "Storm Preparedness Initiatives," in Order No. PSC-06-0781-PAA-EI, Docket No. 060198-EI, dated September 19, 2006 (the "Storm Initiatives Order"). Based on replacement over a 10-15 year period, the estimated annual cost will range from $5 million - $8 million. For 2007, FPL estimates these costs to be $7 million.

FPL's storm hardening plan should result in less storm damage to the electrical infrastructure and therefore less restoration time and cost. For example, in another Hurricane Wilma type event, FPL estimates that hardened feeder pole failure rates and associated restoration time, based on construction man-hours, will be reduced. More generally, FPL's Storm Secure initiatives, including its storm hardening plan, pole inspections, and increased vegetation management activities, can be reasonably expected to reduce future storm restoration costs compared to what they would be without those initiatives. The costs and benefits of FPL's response to the Commission's requirement in Docket No. 060198-EI for 10-point storm implementation plans are discussed in FPL's "Storm Preparedness Initiatives" document, which was filed, reviewed and approved in that docket and is incorporated herein by reference. Hardening the system, increasing pole inspections, enhancing line clearing activities, promoting underground, along with various storm preparedness initiatives will all have an impact on reducing storm damage, reducing or preventing outages, and reducing the overall storm restoration times. Additionally, there will be day-to-day reliability benefits realized. Finally, improved systems and processes, including improved storm forensics, will allow for more and better data to be collected, evaluated and analyzed. Of course, FPL's system is very diverse and geographically large so it will take many years of sustained effort to achieve the full benefits of storm hardening.

While there will be benefits from FPL's Storm Secure initiatives, it is impossible at this time to estimate the full extent of the benefits with any

precision. The actions that FPL is taking and proposing to adopt pursuant to this storm hardening plan represent industry leading changes in construction standards, maintenance practices and restoration processes. The analyses and forensic observations performed after Hurricanes Katrina and Wilma serve as the foundation for FPL's hardening efforts, but there is presently limited or no historical data available for purposes of conducting overall cost/benefit analyses on many of these new actions. As additional storm experience, more and better data, new improved processes, products and materials become available, better detailed cost /benefit analysis will be able to be performed and more cost-effective hardening solutions implemented. In the meantime, FPL believes that implementing its current hardening approach (targeting critical infrastructure for EWL, the application of Incremental Hardening for community projects, and the utilization of the Design Guidelines) is in the best interest of its customers.

In conclusion, without fundamental and significant changes in the way we construct and harden our infrastructure to prevent outages, FPL believes the level of disruptions to its infrastructure from future storms would be much like that experienced in the 2004 and 2005 hurricanes season. It is important to note, however, that regardless of FPL's Storm Secure initiatives, when severe weather events impact our state – outages will occur. It is FPL's intention, however, to take the steps necessary to mitigate such impact. The tactical and strategic initiatives and plans FPL is pursuing, including the hardening plans included in this filing, not only address the resiliency of FPL's system to future severe weather events, but also provide for an increased level of day-to-day reliability for our customers. As new technologies become available and process enhancements and other improvement opportunities are identified, FPL will continue to make refinements to these plans.

INTRODUCTION

In compliance with Rule 25-6.0342, the following provides details on Florida Power & Light's (FPL) electric distribution and transmission infrastructure storm hardening plans.

DISTRIBUTION

1.0 HISTORY / BACKGROUND

Two extraordinary hurricane seasons in 2004 and 2005 have made it clear that significant changes are required in the way that Florida utilities design, construct and operate their electrical systems. This is particularly true for FPL's service territory, which during this time frame experienced the direct hit of five hurricanes and the indirect impact of two others. Standards that have worked well and provided customers with reliable service in the past need to be enhanced going forward. Florida generally, and South Florida in particular, are much more heavily and densely populated than they were at the time of Hurricane Andrew; customers' expectations have changed; and there is evidence that we are in a more active part of a multi-decade hurricane cycle and can expect more frequent storm events. Even if 2004 and 2005 were anomalies, as long-term statistics suggest, FPL must be prepared for further, significant storm activity in the years ahead.

The issue is not whether changes should be made, but what those changes should be. Although no electrical system can be rendered fully resistant to hurricane impacts, FPL's Storm Secure Plan, which was filed on January 30, 2006, outlined changes that FPL proposes to make to benefit our customers and the communities it serves. FPL's approach to new construction, system upgrades and maintenance will provide significant improvements in FPL's system's resiliency to storms and our restoration time after a storm passes. Additionally, it will ensure that a critical mass of providers of basic services, essential to the health and safety of our communities, will have electric service as promptly as possible after a hurricane strike.

The foundation for FPL's detailed hardening plan is the extensive analyses that FPL conducted either directly, or with the aid of external resources, such as KEMA Incorporated. These analyses included detailed forensic observations of how the system performed after Hurricanes Katrina and Wilma. One key finding from the Hurricane Wilma forensic data was that "wind" was the predominant root cause of distribution pole breakage as opposed to, for example, trees or other flying debris. This key data and the overall performance of FPL's transmission poles, which are already built to the NESC extreme wind criteria, forms the basis for FPL's proposal that certain parts of its distribution system be built to this highest criteria.

FPL's Storm Secure Plan contains 4 key elements: (1) hardening the electric infrastructure; (2) investing in underground conversions; (3) increasing the pole inspection program activities; and (4) enhancing our line clearing and vegetation management activities.

In 2006, FPL began to address each one of these 4 elements. For example: (1) FPL initiated and completed several "hardening" pilot projects, including work done at the Port Everglades, as well as several major hospitals; (2) FPL developed and filed a tariff, the Governmental Adjustment Factor (GAF), to promote the conversion of overhead distribution to underground, by providing a 25% investment for applicable local government-sponsored conversions; (3) FPL initiated its 8 year pole inspection program for distribution wood poles and 6 year inspection program for transmission structures; (4) FPL obtained approval to continue its 3 year average cycle for main-line feeders and implement a 6 year average trim cycle for its lateral lines. Additionally, FPL completed all of the 2005 storm repair follow-up work.

It is important to keep in mind that in order to achieve changes to the resiliency of FPL's system, it will take many years of sustained effort. FPL's system cannot be changed overnight. It is very large, geographically diverse and all parts of the system are susceptible to hurricane impact.

Additionally, it is important to not focus on any one aspect. Electrical systems are exposed to a variety of different failure modes under the stress of hurricane conditions and typically each specific failure mode only accounts for a relative small proportion of the total damage. For example, FPL and every other utility experience pole breakage during hurricane conditions. However, even if FPL had experienced zero pole failures during the 2004 and 2005 storms, there still would have been millions of customers without power.

Overtime, substantial improvements to FPL's system will have cost implications for customers. To help control those costs and to get the most system improvement possible, as soon as possible, we have carefully developed our programs to focus early efforts on those parts of the system where the greatest impacts for a given level of investment can be achieved.

2.0 NATIONAL ELECTRICAL SAFETY CODE (NESC) REQUIREMENTS

The NESC is an American National Standard Institute (ANSI – C2) standard that has evolved over the years. As stated in the NESC, "The purpose of these standards is the practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines and associated equipment." The standards cover a wide range of topics including grounding, overhead lines, clearances, strength and loading, underground, and rules for the operation of lines and equipment. The NESC

is currently revised on a 5 year cycle, with the latest edition being 2007. This is the edition presently adopted by the Florida Administrative Code.

The NESC specifies grades of construction on the basis of the required strengths for safety. The relative order of grades of distribution construction is B, C, and N, with Grade B being the highest or strongest. The grade of construction required is determined by the voltage of the circuits involved and what they cross over. Grade C is typically the NESC minimum standard for most electrical distribution facilities. Grade B is only required when crossing railroad tracks, limited-access highways, and navigable waterways requiring waterway crossing permits.

FPL has historically designed its distribution facilities based on the loading as specified in the NESC- Rule 250 B. Combined ice and wind loading for Grade B construction. While this has resulted in a very strong and reliable distribution system, the Rule 250 B criterion is not intended to design facilities for the sorts of extreme wind speed that can be experienced during hurricanes.

2.1 Extreme Wind Loading Criteria (EWL)

EWL is calculated using the wind speeds shown in Figure 250-2(d) of the NESC for Florida. The loading increases significantly with an increase in the wind speed since the wind loading formula uses the square of the wind speed.

Once the load is determined, it is multiplied by the appropriate Load Factor based on the Grade of Construction. This "factored" load is then used to determine the required structure (pole) strength. The strength of various poles is dependent on the material from which they are made. The strength of wood poles is published in ANSI O.5. The strength of poles made from other materials is provided by the manufacturer. Once the strength of a pole is known, it is multiplied by a Strength Factor based on the grade of construction and the material from which the pole is made. This "factored" strength then has to be equal to or greater than the "factored" load.

All facilities that are to be attached to the pole must also be accounted for when determining the desired strength of the structure. This includes the wind load on the pole itself, as well as the conductors, transformers, communication cables and equipment on the pole. The design loading impact to meet EWL usually requires some combination of stronger poles and shorter span lengths (distance between poles) to reduce the wind loading imposed on the conductors and cables. The NESC requires the use of EWL for facilities that exceed 60 feet above ground or water level – normally transmission level structures.

2.2 FPL Compliance

FPL has historically utilized Grade B construction for all distribution lines, other than during a brief period (1993-2004) when, based on a probabilistic study of hurricanes at that time, a portion of FPL's territory utilized Grade C construction. Since Grade B is stronger than Grade C construction, FPL's distribution facilities comply with and, in most cases, exceed the minimum requirements of the NESC. FPL's Distribution Engineering Reference Manual (DERM) and Distribution Construction Standards (DCS) are revised as required to ensure compliance with all applicable rules and regulations. For the purpose of implementing FPL's hardening plan, addenda to the DERM and DCS have been developed to address the specific requirements needed to meet the NESC EWL.

3.0 INFRASTRUCTURE HARDENING STRATEGY

FPL's distribution infrastructure consists of feeders (main distribution lines) and laterals (fused circuits that run off feeder lines), both of which carry primary voltage, as well as lines that carry secondary voltage (e.g., services). To harden its distribution infrastructure, FPL is proposing a three pronged approach: EWL; Incremental Hardening; and revised Design Guidelines. The initial focus of applying EWL will be on feeders and any associated laterals directly serving critical customers, as well as, certain critical poles. Feeders are the backbone and therefore a critical component of FPL's overall distribution overhead system. Feeder reliability can have a substantial impact on overall service reliability to our customers. The next prong, Incremental Hardening, will target existing feeders, that with targeted modifications, the entire feeder's wind profile can be increased, up to and including EWL. The third prong will be the system-wide implementation of FPL's proposed Design Guidelines, which apply EWL criteria to the design and construction of all new overhead facilities, major planned work, relocation projects and daily work activities. This three pronged approach allows FPL to obtain hardening benefits more promptly and cost-effectively across its entire electric system. FPL will continue to evaluate its approach as new products and more cost-effective work methods are developed. The application of this three pronged approach is explained in Section 5.0 below.

4.0 EXTREME WIND SPEED REGIONS FOR APPLICATION OF EWL

To apply the NESC extreme wind map for Florida, FPL proposes to implement the application of EWL into three wind regions, corresponding to expected extreme winds of 105, 130 and 145 mph.

FPL reviewed its practices and procedures and determined that the most effective option for implementation of the extreme wind map would also be by county. Each of the counties that FPL serves was evaluated by applying the highest wind rating for that county.
FPL decided on the three extreme wind regions of 105, 130 and 145 mph for the following reasons:

- A smaller number of wind regions generate advantages through efficiency of work methods, training, engineering and administrative aspects such as standards development and deployment.
- 105, 130 and 145 mph is a well balanced approach to meet the EWL criteria in the counties within each region.

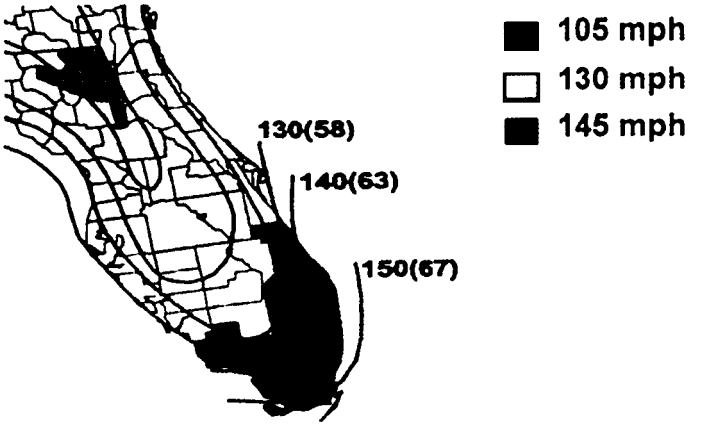


Figure 4-1 FPL Extreme Wind Regions (Meter/Sec)

Note: One exception will be made to the three wind regions, for the sparsely populated extreme southern tip of FPL's service territory. The design EWL wind speed for this area will be 150 mph.

5.0 APPLICATION OF NEW DESIGN AND CONSTRUCTION STANDARDS

5.1 EWL

EWL will be applied to Top CIF feeders and any associated laterals directly serving critical customers. These facilities are critical and essential to the health, safety, welfare and security of the public. Examples of customers served by these facilities include hospitals, 911 Centers, special needs shelters, water treatment plants, police and fire stations. To help identify these facilities, FPL has established a partnership with local Emergency Operations Centers, who assisted in providing input and selecting the most critical facilities. Based on this list, FPL's proposed plan is to harden these

facilities to EWL where feasible, practical, and cost-effective. In the first phase of applying EWL, FPL is targeting acute care facilities, i.e. major hospitals.

EWL will also be applied to poles included in FPL's Targeted Critical Pole (TCP) Program. FPL's TCP Program focuses on poles that can impact restoration efforts. The initial focus of this program includes poles associated with overhead limited access highway crossings. If these poles fail they can impede the flow of traffic and emergency vehicles. Priority will be given to potential evacuation routes or those highways used to provide relief efforts soon after the storm. TCP's also include the first distribution pole out of a substation. If these poles fail, an entire feeder and associated laterals would lose service. All TCP's will be hardened to EWL where feasible, practical, and cost-effective.

5.2 Incremental Hardening

The objective of Incremental Hardening is to optimize the existing distribution infrastructure and increase the overall wind profile of a feeder to a higher wind rating, up to and including EWL. Incremental hardening will apply appropriate combinations of cost-effective engineering options (e.g., storm guying, relocation, adding intermediate poles, upgrading the pole, etc.) to eliminate weaker links and take advantage of the existing storm resilience of a feeder. Incrementally hardening a feeder may not always achieve EWL, however, this approach will position FPL to do so in the future.

Figures 5-1 and 5-2 illustrate an example of incremental hardening. In this example the wind rating of the two highlighted poles falls below the wind profile of the remaining portion of the feeder. The wind rating gap between Pole 2 and Pole 3 is considered the "natural breakpoint." All poles whose wind rating is below the rating on Pole 3 will be upgraded.

Before Incremental Hardening

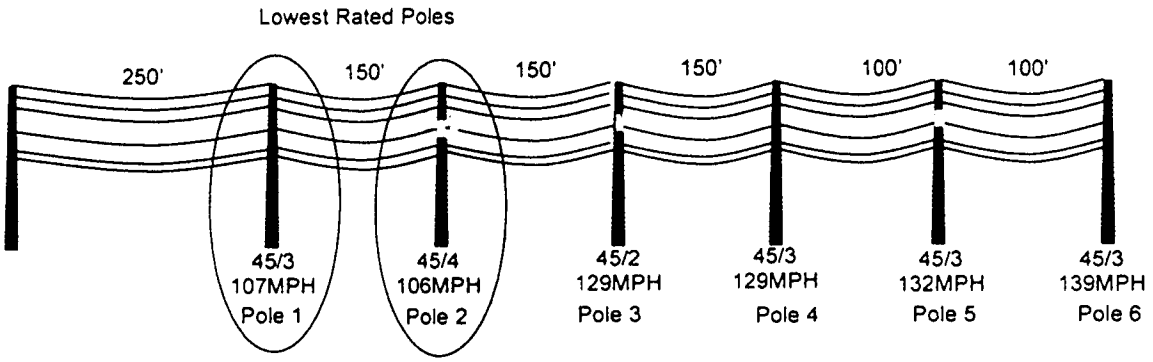


Figure 5-1: Feeder Wind Profile Before Incremental Hardening

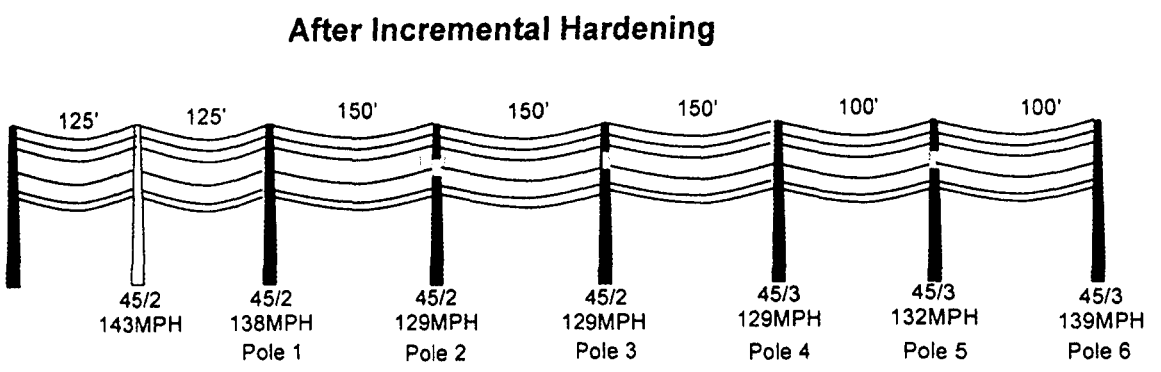


Figure 5-2: Feeder Wind Profile After Incremental Hardening

By targeting poles 1 and 2 for upgrading and installing an intermediate pole before pole 1, the feeder's overall wind profile has been raised to a higher wind rating in a cost-effective manner.

Initially, incremental hardening will target "community projects". Community Projects are associated with feeders that serve community needs such as grocery stores, gas stations and pharmacies. These types of services have also been identified as an essential need within the communities FPL serves. Typically these types of businesses are located nearby major thoroughfares and provide easy access to the community.

FPL will also focus on incremental hardening of poles that are critical during restoration events, but are not TCP's. These critical poles have additional electrical equipment or facilities attached such as automated feeder switches, capacitor banks and multiple circuits.

5.3 Design Guidelines for New Construction

FPL is proposing to utilize its revised Design Guidelines and processes to apply EWL for new construction, major planned work, relocation projects and daily work activities. Depending on the scope of the work that is performed in a particular project, this could result in EWL hardening for an entire circuit (in the case of large-scale projects) or in EWL hardening of one or a small number of poles (in the case of small projects) so that the affected circuit will be in a position to be fully EWL hardened in the future. These guidelines primarily are associated with changes in pole class, pole type and desired span lengths to be utilized. Standardizing these processes will ensure that this type of construction work aligns with FPL's hardening strategy.

FPL's pole sizing guidelines now provide for a minimum installation of Class 2 wood poles for all new feeder and three-phase lateral work in cases where previous designs might have called for a Class 3 wood pole. For two-phase and single-phase lateral work, a Class 3 wood pole is now required, where

previous designs might have called for a Class 5 wood pole. For service and secondary work, a minimum of a Class 4 wood pole is to be used, where previously Class 5 or 6 wood poles could have been used. For critical poles, FPL is proposing to install concrete poles at accessible locations. These changes position FPL for hardening complete existing circuits to EWL in the future.

The following Table 5-1 illustrates a sample comparison of the Present Standard vs. Proposed Hardening Guidelines and the average percentage increase in wind rating. MPH calculations are dependent on various factors, including span length, equipment and attachments, framing, etc. Variations in any of these factors may yield different results.

Pole Type	Present Guideline	New Guideline	Average % Increase in Wind Rating
Critical Pole	**Class 3 (wood)**	**Class III-H (concrete)**	**23%**
Feeder Pole	**Class 3 (wood)**	**Class 2 (wood)**	**11%**
Lateral Pole	**Class 5 (wood)**	**Class 3 (wood)**	**22%**
Service Pole	**Class 5 (wood)**	**Class 4 (wood)**	**11%**

Table 5-1 Design Guidelines Pole Recommendations

FPL's Distribution Design Guidelines are included in the Appendix, which is attached to this filing.

5.4 Hardening Existing Facilities

To determine how a circuit or critical pole will be hardened, a field survey of the circuit facilities must be performed. By capturing detailed information at each pole location such as pole type, class, span distance, attachments, wire size and framing, a comprehensive windloading analysis can be performed to determine the current wind rating of each pole, and ultimately the circuit itself. This data is then used to identify the specific pole locations within the circuit that do not meet the desired wind rating. Once locations have been identified, recommendations to increase the allowable wind rating of the pole can be made.

FPL proposes to utilize a "design toolkit" that focuses on evaluating and using cost-effective hardening options for each location. Examples of options in the toolkit include the following:

- Storm Guying – Install one guy in each direction perpendicular to the line of lead. This is a very cost-effective option; however, proper field conditions need to be present to allow for installation.
- Equipment Relocation – Equipment on a pole may be moved to a near-by stronger pole or one with a higher allowable wind rating.
- Intermediate Pole – Install a single pole when long span lengths are present. By reducing the span length, the wind rating of both adjacent poles is increased.
- Upgrading Pole Class – Replace the existing pole for a higher class pole to increase the pole's wind rating.
- Undergrounding Facilities – Utilize if there are significant barriers to build overhead or if it is a more cost-effective option for a specific application

These options are not mutually exclusive and when used in combination with sound engineering practices, can provide a cost-effective method to harden a circuit.

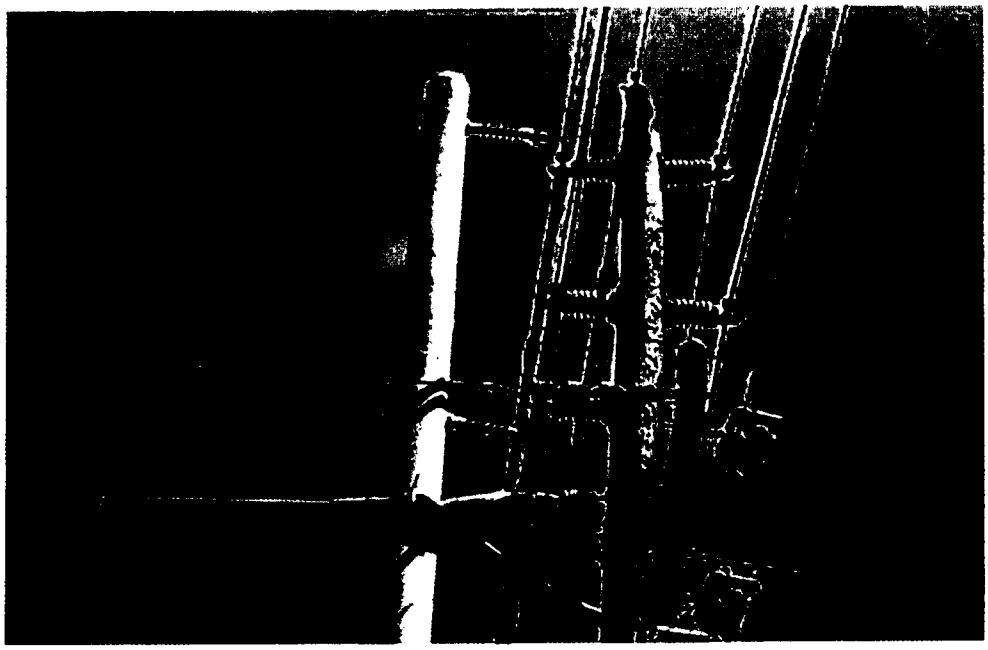
Design recommendations on any given project, will take into account hardening (making facilities more resilient to storm force winds), mitigation (if circuit fails, how can damage be minimized), as well as restoration (improving the efficiency of restoration in the event of failure). Since multiple factors can contribute to losing power after a storm, utilizing this pronged approach will help in reducing the amount of work required to restore power to a damaged circuit.

6.0 DEPLOYMENT PLANS

2006 Projects

In 2006, FPL made an industry-leading move by piloting EWL, the standard for transmission construction, in four distribution infrastructure hardening projects. These projects included hardening the distribution facilities serving: Port Everglades; Port of Palm Beach; St. Mary's Hospital; Jackson Memorial Hospital and Mount Sinai Medical Center. These facilities were initially selected because they are part of the critical South Florida infrastructure network that provides fuel and emergency health care after a hurricane. In total, these four projects required more than 30,000 man hours of work, retrofitting 14 feeders and replacing more than 500 poles. These projects brought additional challenges, such as installing larger poles in established neighborhoods, coordination with customers and maintenance of traffic. However, completing these pilot projects not only increased the storm resilience of some of Florida's most vital infrastructure, it also provided valuable insight into implementing storm hardening on a broader, system-wide effort.

Mount Sinai Hospital project on Miami Beach required special equipment, traffic control and coordination with the community.



Wood poles replaced with spun concrete on Jackson Memorial Hospital project

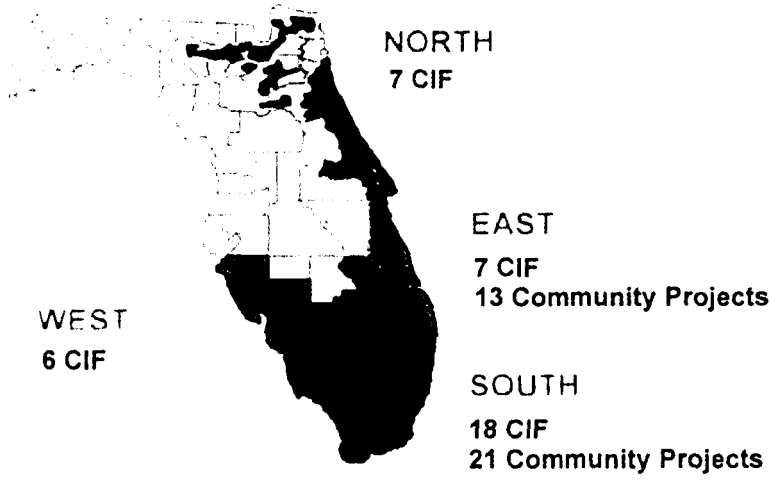
2007 Deployment Plan

In 2007, FPL proposes to utilize EWL to harden thirty four (34) feeders and the associated laterals directly serving (28) twenty eight CIF customers and four system critical facilities. The TCP Program will also focus on hardening to EWL approximately 43 overhead Highway Crossings on Interstate 75 and the Turnpike in Miami-Dade and Broward counties and seventy eight (78) additional critical poles, each being the first feeder pole outside of a substation. These 78 poles have been targeted because of their criticality in expediting restoration efforts and have been prioritized so that circuits with the largest customer counts are completed first.

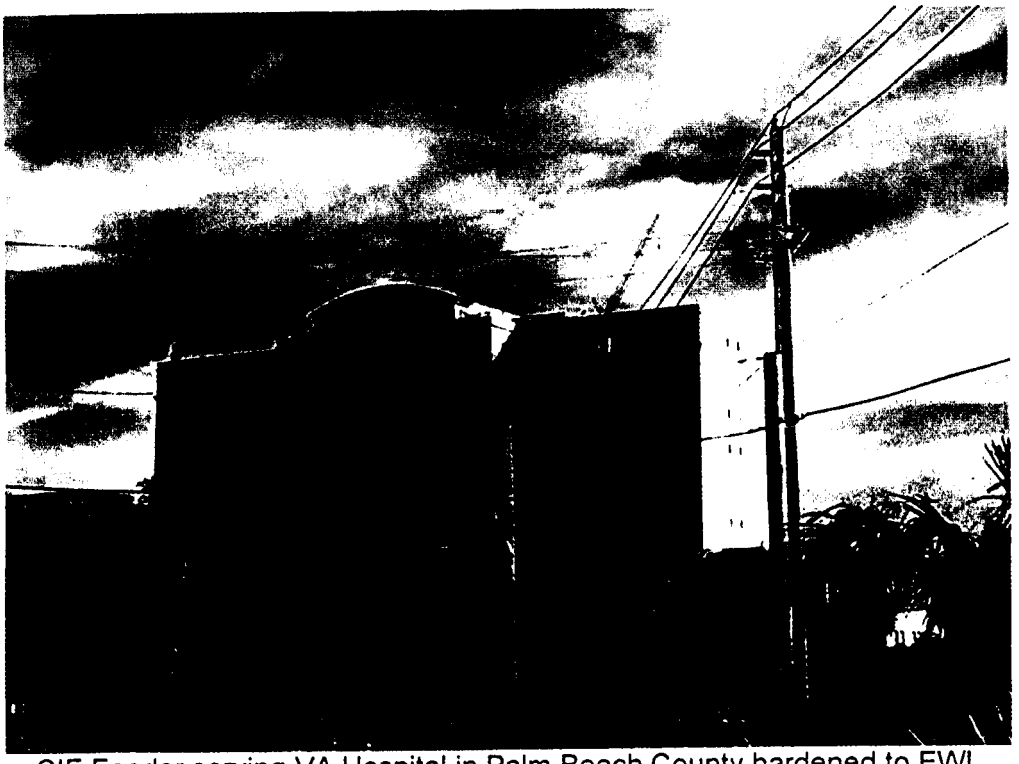
In addition to the facilities serving CIF customers, FPL plans to complete Incremental Hardening on feeders associated with thirty-four (34) community projects. The majority of these are located in the Tri-County area (Miami-Dade, Broward, and Palm Beach counties) where FPL has its highest density of customers.

Lists of the CIF Customers and Community Projects' feeders planned for 2007 are included in the Appendix to this filing. Below is map which helps to identify where these projects are located.

Figure 6-1 – 2007 Feeder Hardening Map



Deployment plans and estimates utilizing the application of design guidelines were developed based upon historical new pole installations and replacements, expansion plans, as well as known relocation projects. The proposed 2007 deployment plan corresponds to approximately 145 overhead circuit miles and includes approximately 5,800 poles. It is estimated that over 50% of the 5,800 poles included in the 145 overhead circuit miles already meet EWL and will not require any additional hardening.



CIF Feeder serving VA Hospital in Palm Beach County hardened to EWL

EWL hardening CIF Feeder serving Halifax Hospital in Central Florida

2008 Deployment Plan

In 2008, FPL will continue to address CIF hardening, critical poles, and community projects, and will continue to utilize the Design Guidelines. FPL estimates it will harden approximately 85-125 feeders, most of which serve CIF customers and community projects.

2009 Deployment Plan

In 2009, FPL will continue to address CIF hardening, critical poles and community projects, and will continue to utilize the Design Guidelines. FPL estimates it will harden in the range of 80-150 feeders, most of which will serve CIF customers and community projects.

7.0 DESIGN AND CONSTRUCTION STANDARDS

7.1 Distribution Engineering Reference Manual (DERM)

FPL publishes its DERM to convey the standards of distribution design. The DERM provides FPL's designers with a reference for designing distribution facilities. This reference manual contains background information, engineering considerations, examples of necessary calculations and tables developed from the calculations. The tables are a guide for general applications whereas the examples provide the designers with the method to design facilities not included in the Tables. When the proposed criteria are adopted, FPL will publish and issue an "Addendum" to its DERM as a supplemental publication to enable the designers to design distribution facilities based on the 2007 NESC EWL criteria. A copy of the proposed DERM Addendum is included in the Appendix attached to this filing.

7.2 Distribution Construction Standards (DCS)

FPL's DCS provides the designers and the construction crews with information needed to build the distribution facilities. Designers use the manual to convey instructions to the field. The field crews use the manual to construct the facilities. The DCS contains drawings and instructions on clearances, framing (how facilities will be arranged on the pole), grounding, guying, equipment, and the assembly of the various parts. When the proposed criteria are adopted, FPL will publish and issue an "Addendum" to its DCS as a supplemental publication to enable the field crews to build distribution facilities based on the 2007 NESC EWL criteria. A copy of the proposed DCS Addendum is included in the Appendix attached to this filing.

7.3 Design Guidelines

FPL has developed Design Guidelines and a Quick Reference Guide to allow the field designers a simple reference document when the details provided in the DERM and DCS are not needed to develop the design plan. The intention of this document is to standardize designs for hardening as it relates to new construction, major planned work, relocations as well as daily work activities. These guidelines are primarily associated with changes in pole class, pole type and desired span lengths for overhead construction. In addition, FPL has proposed additional hardening guidelines for poles that are deemed critical for general operations or during restoration events. A copy of the Design Guidelines and the Quick Reference Guide are included in the Appendix.

8.0 ATTACHMENTS BY OTHER ENTITIES

8.1 Attachment Standards and Procedures

There are attachments by other entities to FPL poles throughout its service area. These attachments are made by Incumbent Local Exchange Carriers (ILEC), Cable TV Companies (CATV), Telecommunication Carriers and Governmental Entities (Non-ILEC). Additionally, FPL attaches to ILEC poles. The standards and procedures for these attachments, created to ensure conformance to FPL's standards and hardening plans as required by the FPSC, are attached and included in the Appendix.

8.2 Input from Attaching Entities

On March 22, 2007, FPL mailed an informational package regarding its 2007-2009 hardening plans as well as the current draft of its "Attachment Standards and Procedures" to all attaching entities. In total, over 95 packages were sent to these entities which included cable TV, telecommunication, and telephone companies as well as city and county agencies. FPL requested attaching entities to provide their input to FPL by April 23, 2007, including their costs and benefits associated with FPL's proposed hardening plans. Additionally, to provide these attaching entities an opportunity to better understand FPL's plans, FPL held a meeting at its General Offices in Miami, Florida on April 12, 2007. 15 representatives from cable TV, telephone and telecommunication companies, as well as one city agency, attended. At the meeting, several of the attaching entities requested, and FPL agreed to provide, additional details concerning FPL's 2007 deployment plans. On April 16, 2007, FPL provided to these attaching entities a CD containing engineering drawings, where completed, or asset management circuit

drawings for those designs not completed, for all 72 circuits that FPL is planning to harden in 2007.

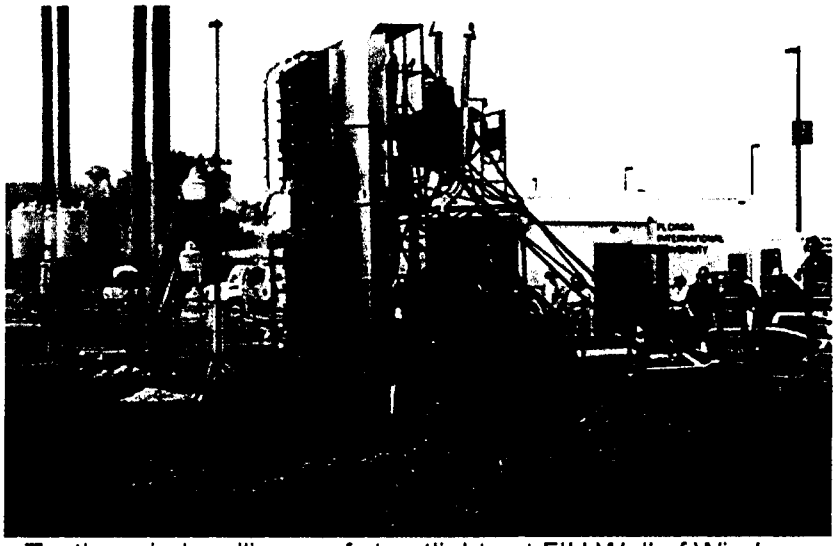
To date, FPL has received comments from 6 attaching entities. FCTA was the only attaching entity to provide specific comments on FPL's construction and attachment standards. FPL has incorporated several of the FCTA's recommended changes into its standards. For example, at FCTA's suggestion, FPL has clarified the language in its attachment standards regarding overlashing of cable. AT&T Florida (BellSouth) and Embarq expressed difficulties with providing accurate estimated cost impacts, stating that more time and/or information is required. Both AT&T Florida and FCTA also suggested further dialogue to better understand the plans and provide more accurate cost estimates. FPL agrees that a meeting or workshop would be beneficial. Palm Beach County suggested further discussions between the County and FPL regarding the selection of critical facilities and community projects in Palm Beach County. FPL will be contacting the County in the near future to have those discussions. Cost impacts and benefits that were provided are included in Section 11, Costs and Benefits. The complete comments received from attaching entities are attached and included in the Appendix.

9.0 RESEARCH AND DEVELOPMENT

Design and construction to NESC EWL involves more than just engineering reference manuals and construction standards. Efforts are also underway to seek out and evaluate new products, work methods, and construction techniques that will enable FPL to cost-effectively build to this increased standard. Concurrent with this effort, FPL is also evaluating its existing construction practices to ensure they are adequate to meet EWL. Examples of these efforts include:

- FPL conducted a supplier symposium in June 2006 that included over 50 companies that manufacture and supply electrical transmission and distribution equipment. This event highlighted FPL's effort to build to extreme wind and solicited input and assistance from these organizations to become innovative as FPL makes changes to its construction standards and methods. Some examples of ideas generated during this meeting included lighter concrete poles and composite material poles
- As part of the KEMA involvement with FPL's Storm Secure effort, additional data was gathered regarding other utilities hardening efforts. Some of the companies included in this effort were Tokyo and Chubu Electric, Guam Power, Hydro Quebec, Arizona Public Service, Southern California Edison, and Kansas City Power and Light.
- Different types of pole technologies; including steel, iron, several formulations of concrete, wood and composite materials; are presently under various stages of evaluation.

- A comprehensive evaluation of available composite material poles is underway. This has included inspections of manufacturing facilities, observation of certified strength testing to ANSI standards, installation of several poles at FPL's Miami Training and Methods Center, and engineering calculations involving flexibility of these poles.
- FPL is evaluating heavy-duty field equipment that will allow for the installation of heavier concrete poles without the use of costly cranes. At the same time, joint efforts between FPL and concrete manufacturers to develop a lighter weight/same strength concrete pole are on-going.
- Utilizing lessons learned from previous storms, FPL is also evaluating: design changes to streetlight brackets; stronger bracing of steel cross-arms on wood poles; attachment of riser shields to poles; construction techniques for slack spans: mechanical service disconnect devices. FPL is also performing tests on how best to attach wire to insulators
- As part of the efforts to strengthen existing installations, specifications and application guidelines are being written to use a newly developed pole reinforcement method called the ET Truss. This enables a pole to be strengthened cost-effectively, avoiding a pole replacement.
- For underground facilities, FPL is piloting the use of a below-grade switch that could be better able to withstand the affects of wind and flooding.
- FPL is actively engaged in a collaborative research effort with the Public Utility Research Center (PURC), all Florida investor owned utilities, Co-ops, and Municipalities. Initial focus areas are undergrounding, wind testing and vegetation management.
- FPL is involved with the Florida International University "Wall of Wind" storm hardening research project. This 2-fan system generates up to 120 mph winds and includes a water-injection system to simulate horizontally-flowing rainfall under hurricane conditions. FPL has already tested certain equipment including single and three phase transformers, capacitor bank, riser u-guard, and various streetlight brackets. Over time, this test facility will be able to generate wind speeds up to 150 mph.



Testing wind resilience of streetlights at FIU Wall of Wind

FPL expects that these efforts will lead to new standards, processes, products and work methods that will provide cost-effective measures to strengthen the electrical infrastructure.

10.0 UNDERGROUND DISTRIBUTION FACILITIES

10.1 Underground Systems

FPL's current underground construction systems include the following design applications:

- Pad-mounted, above grade transformers and switch gear for typical URD subdivision and small commercial areas.
- Concrete encased duct and manhole systems with above grade vaults in designated areas of high load density, where it is feasible, practical and cost-effective, for example, in Miami Beach, Fort Lauderdale and Sarasota.
- Secondary network systems with redundant throw-over, as in downtown Miami.

The current FPL system has approximately 66,300 total miles of distribution infrastructure. Underground power lines make up 37% (24,700 miles) of this total with about 7% (1,700 miles) being in concrete encased duct bank. In the past five years, over 60% of all new distribution construction throughout the FPL service territory has been installed underground. In the tri-county area of Miami-Dade, Broward and Palm Beach Counties, where local ordinances for Underground Residential Distribution (URD) construction exist, approximately 90% of new construction was installed underground.

10.2 Equipment Technologies

The standard FPL URD equipment for all new underground residential distribution (pad-mounted transformers, switch cabinets, etc.) is dead-front made from stainless steel, or in combination with mild steel. Stainless steel equipment has the advantage of extended service life due to its resistance to weathering and corrosion, but has a considerably higher initial cost. Dead-front equipment (i.e., without energized parts exposed on the operating side of the equipment) is more reliable, and more resistant to flooding.

FPL does not presently use submersible equipment. Past installations which were in high-density downtown sidewalk vaults have experienced reliability issues, require large installation spaces and are costly to build and maintain.

Currently, FPL has a pilot project on Jupiter Island to test a Vista Gear (i.e., a below grade, submersible URD type switch) to determine whether if offers some added storm flooding resiliency.

10.3 Installation Practices

FPL complies with existing local ordinances when constructing underground systems. The Florida Building Code leaves the responsibility of determining adequate floodplains to each municipality which usually base their local ordinances on Federal Emergency Management Agency 100-year flood criteria.

10.4 Hardening and Storm Preparedness

Approximately 20% of FPL's underground distribution infrastructure is within the Category 1 - Category 3 floodplain as defined by the Florida Department of Community Affairs. However, FPL has not historically been as severely impacted by storm surge from hurricanes as it has been by wind. Recognizing that underground equipment is less impacted by predominantly wind events, FPL proposed the Governmental Adjustment Factor (GAF) tariff to promote conversion of electric facilities from overhead to underground. Through the GAF, which was approved by the Commission on April 24, 2007, FPL provides a 25% investment for the cost of qualified local government-sponsored conversion projects.

FPL has guidelines in place for the prompt post-storm inspection and mitigation of damage to equipment exposed to flooding or storm surge. These guidelines outline the necessary steps to purge any sand and water that has invaded the equipment and to restore it to service.

11.0 PROJECTED COSTS AND BENEFITS

11.1 Costs

FPL

In 2007, FPL plans to harden 72 feeders, which provide service to critical infrastructure and special community needs. Additionally, FPL is beginning to implement hardening criteria for new construction, major relocations and other work. Utilizing current work methods, products and equipment, this work is estimated to cost from $40 to $70 million.

In 2008 and 2009, FPL expects to continue this strategy for hardening its infrastructure, including targeting 85-125 circuits in 2008 and 80-150 in 2009. Each year the plan focuses on circuits with increasing lengths, potentially translating into higher program costs. The projected costs for 2008 and 2009 are $75 to $125 million and $100 to $150 million, respectively. These estimates are based upon current work methods, products, and equipment and assume the necessary resources will be available to execute the plan.

Attaching Entities

Two of the attaching entities, AT&T Florida and Fibernet, provided cost estimates specifically for 2007. AT&T Florida estimated costs of $4.4 million and Fibernet estimated costs of approximately $15,600. AT&T Florida and Fibernet did not provide cost estimates for 2008 and 2009. In addition, Embarq provided cost estimates ranging from $14.0 million to $35.0 million for the period 2007-2009. At this time, FPL has not closely scrutinized the basis for the attaching entities' cost estimates. However FPL notes that Embarq's $14 million cost estimate is based on an assumption that FPL will harden 20% of its poles in the first 3 years of the plan, while the $35 million estimate is based on hardening 50% of the poles during that period. Both of these pole replacement assumptions are inconsistent with FPL's hardening plan and are substantially overstated. FPL has approximately 1.1 million poles, so Embarq's 20%-50% pole replacement assumptions would imply that FPL would replace between 220,000 and 550,000 poles over the period 2007-2009. In fact, FPL estimates that its replacements over that period will total only about 5 to 10 percent of Embarq's assumptions. FCTA, AT&T Florida and Embarq also noted that pole rental rates would likely be impacted. The FCTA, City of Hollywood and Palm Beach County did not quantify any estimated cost impacts. The complete comments received from attaching entities are attached and included in the Appendix.

11.2 Benefits

FPL

For category 1, 2 and 3 hurricanes, FPL's storm hardening plan should result in less storm damage to the electrical infrastructure and therefore less restoration time and cost. For example, in another Hurricane Wilma type event, FPL estimates that hardened feeder pole failure rates and associated restoration time, based on construction man-hours, will be reduced. More generally, FPL's Storm Secure initiatives, including its storm hardening plan, pole inspections, and increased vegetation management activities, can be reasonably expected to reduce future storm restoration costs compared to what they would be without those initiatives. The costs and benefits of FPL's response to the Commission's requirement in Docket No. 060198-EI for 10-point storm implementation plans are discussed in FPL's "Storm Preparedness Initiatives" document, which was filed, reviewed and approved in that docket and is incorporated herein by reference. Hardening the system, increasing pole inspections, enhancing line clearing activities, promoting underground, along with various storm preparedness initiatives will all have an impact on reducing storm damage, reducing or preventing outages, and reducing the overall storm restoration times. Additionally, there will be day-to-day reliability benefits realized. Finally, improved systems and processes, including improved storm forensics, will allow for more and better data to be collected, evaluated and analyzed. Of course, FPL's system is very diverse and geographically large so it will take many years of sustained effort to achieve the full benefits of storm hardening.

While there will be benefits from FPL's Storm Secure initiatives, it is impossible at this time to estimate the full extent of the benefits with any precision. The actions that FPL is taking and proposing to adopt pursuant to this storm hardening plan represent industry leading changes in construction standards, maintenance practices and restoration processes. The analyses and forensic observations performed after Hurricanes Katrina and Wilma serve as the foundation for FPL's hardening efforts, but there is presently limited or no historical data available for purposes of conducting overall cost/benefit analyses on many of these new actions. As additional storm experience, more and better data, new improved processes, products and materials become available, better detailed cost /benefit analysis will be able to be performed and more cost-effective hardening solutions implemented. In the meantime, FPL believes that implementing its current hardening approach (targeting critical infrastructure for EWL, the application of Incremental Hardening for community projects, and the utilization of the Design Guidelines is in the best interest of its customers.

Attaching Entities

AT&T Florida noted that the most significant benefit would be the potential reduction of storm outages at its commercial facilities; however, the benefit could not be quantified at this time. Embarg commented that benefits will not be known until the next storm. The remaining attaching entities provided no comments on benefits.

TRANSMISSION

1.0 HISTORY / BACKGROUND

While FPL's transmission facilities were also affected by the 2004 and 2005 storms, the damage experienced was significantly less than the damage experienced by distribution facilities. A primary reason for this is due to the fact that transmission structures are already constructed to meet EWL. However, FPL's Storm Secure Plan identifies several initiatives specifically addressing the transmission infrastructure. In 2006, FPL increased its inspection cycle of transmission structures to a six year cycle, consistent with the FPSC order issued in April 2006.

2.0 NESC REQUIREMENTS AND COMPLIANCE

FPL transmission line structural designs are mandated by Florida Statute Section 366.04, which requires that all high voltage transmission structures satisfy the requirements specified by the NESC. ANSI C2 addresses EWL criteria (Rule 250C) and covers all wind sensitive factors and wind related effects that need to be considered in the design calculations. FPL transmission structures are designed to meet EWL under NESC Rule 250 C and are constructed to meet Grade B Construction under NESC Sections 25 and 26.

3.0 DETERMINATION OF EXTREME WIND SPEEDS FOR APPLICATION OF EWL

For transmission structures, FPL interpolates the NESC wind load contours (Figure 250-2d) into 5 mph intervals. Based on the global position system (GPS) coordinates, transmission structures are designed for the upper wind speed of each interpolated 5 mph wind contour interval.

4.0 DESIGN AND CONSTRUCTION STANDARDS

FPL's transmission and substation system is already designed for EWL using the following design standards:

NESC

- As required by Florida Statute Section 366.04

American Society of Civil Engineers (ASCE)

- Minimum Design Loads for Buildings & Other Structures "ASCE/SEI 7-05"

- Design of Steel Transmission Pole Structures "ASCE/SEI 48-05"
- No. 74: Guidelines for Electrical Transmission Line Structural Loading
- No. 91: Design of Guyed Electrical Transmission Structures
- ASCE/PCI, Guide for the Design of Prestressed Concrete Poles

Institute of Electrical and Electronics Engineers

- IEEE Standard 751 – 1990, IEEE Trial-Use Design Guide for Wood Transmission Structures

FPL's transmission construction standards are incorporated into the following two books as summarized below:

Transmission Structure Standards (TSS)
The TSS includes drawings showing the framing and configuration of both current and historical transmission structures. Each structure standard drawing includes dimensions, material lists, and any applicable transmission installation specification (TIS) standards.

Transmission Installation Specification (TIS)
The TIS includes installation and testing procedures for various transmission components. The book contains the following sections:

1. Anchors & Foundations
2. Bonding & Grounding
3. Conductor & Conductor Fittings
4. Poles & Structures
5. Right-of-Way Items
6. Insulator & Arrester
7. Fiber Optics

Construction or installation specifications that are unique to a particular location and not incorporated in either standard referenced above are incorporated in the construction package for the individual project.

5.0 DEPLOYMENT STRATEGY

Since FPL's transmission and substation system is already designed for EWL, FPL does not believe there is a general need for further hardening of that system. However, based on experience with the performance of the system, including specific lessons learned from the 2004-2005 storm seasons FPL has the following two transmission Storm Secure initiatives which have been previously approved by the Commission as part of FPL's "Storm Preparedness Initiatives" in Order NO. PSC-06-0781-PAA-EI, Docket No. 060198-EI, dated September 19, 2006.

1. **Single Pole Un-Guyed Wood Transmission Structures**
   FPL has implemented a comprehensive plan for replacing existing single pole un-guyed wood transmission structures with FPL's current design standards. Although designed for EWL, these structures accounted for 68% of all the transmission structures requiring replacement during the 2004-2005 storm seasons.

2. **Ceramic Post Transmission Line Insulators**
   FPL has implemented a comprehensive plan for replacing existing ceramic post insulators on concrete poles with FPL's current design standards. Although designed for EWL, ceramic post insulators on concrete poles accounted for 68% of all the insulators replaced as a result of the 2004-2005 storm seasons.

FPL forecasts completion of these two storm secure initiatives over the next 10 to 15 years. For the single pole un-guyed wood transmission structure initiative, approximately 300 structures will be targeted for replacement each year. For the replacement of ceramic post insulators on square concrete poles, approximately 450 structures will be targeted for re-insulation each year.

FPL will prioritize its two transmission storm secure initiatives based on factors including proximity to high wind areas, system importance, customer count, and coordination with the distribution CIF storm initiative. Other economic efficiencies, such as performing work on multiple transmission line sections within the same corridor, are also considered.

In 2007, transmission has focused efforts starting in the tri-county areas of Miami-Dade, Broward, and Palm Beach Counties where the code specified wind speeds are higher.

FPL will provide updates of these transmission storm secure initiatives in its annual March 1 filing with the FPSC.

6.0 COSTS AND BENEFITS

FPL estimates the total cost for the two transmission structure hardening initiatives to be approximately $80 million. Based on replacement over a 10-15 year period, the estimated annual cost of the program will range from approximately $5 million to $8 million. For 2007, FPL estimates these costs to be $7 million.

Docket No. 070301-EI
FPL Storm Hardening Plan
Exhibit MBM-1 Page 31 of 223

Distribution Design Guidelines

The following guidelines will be used to standardize the design of FPL's overhead distribution facilities when practical, feasible and cost effective.

General

1. Every attempt should be made to place new or replacement poles in private easements or as close to the front edge of property (right of way line) as practical.

2. Overhead pole lines should be placed in front lot lines or accessible locations where feasible.

3. Concrete poles are not to be placed in inaccessible locations or locations that could potentially become inaccessible.

4. When performing work that will affect an existing Top CIF feeder, always contact Storm Secure regional project manager prior to design.

5. When performing new construction, the new pole line will be designed to meet Extreme Wind Load (EWL).

As always, good engineering judgment, safety, reliability, and cost effectiveness should be considered.

In addition to these guidelines, all distribution facilities shall be engineered to meet the minimum requirements set forth in all applicable standards and codes including but not limited to the National Electrical Safety Code (NESC), and Utility Accommodation Guide.

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New Construction / Existing / Maintenance

1. When installing and/or replacing a feeder, lateral or service pole on an existing pole line, please reference the pole sizing guidelines listed under the Hardening Design Guidelines section (page 5 of 6) to determine pole class and type.

2. When performing work that will affect a Top CIF feeder, always contact Storm Secure regional project manager prior to design.

3. When extending an existing pole line, the existing pole type, wood or concrete, should be used as a guide for the new poles, while still maintaining the minimum requirements as set forth in these guidelines.

Relocation

1. When relocating either a concrete or wood pole line for a highway improvement project, the existing type pole line should be used as a guide for replacements.

2. When performing work that will affect a Top CIF feeder, always contact Storm Secure regional project manager prior to design.

3. Agency relocation projects should be coordinated with Distribution Planning to take into account potential feeder boundary changes.

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Hardening Design Guidelines

The following hardening guidelines will standardize the design of FPL's overhead distribution facilities when feasible, practical and cost effective. Foreign pole owners are required to discuss design requirements with FPL prior to construction. FPL will assist with identifying the critical poles.

1. Concrete poles are preferred in the cases where replacement costs would be extremely high (i.e. Duct system riser pole, corner poles with multiple circuits, critical poles, etc). Please reference the Critical Pole list below for more information.

2. The following list comprises what will be considered critical poles. When installing and/or replacing an accessible critical pole, use concrete. If the pole is inaccessible, use a Class 2 wood pole, or consider relocating the equipment to an accessible concrete pole.

Critical Pole List
1st switch out of the substation [1]
Automated Feeder Switches (AFS)
Interstate / Highway Crossings [1,2]
Capacitor Banks
Poles with multiple primary risers
3 Phase Reclosers
Aerial Auto Transformers
Multi-Circuit Poles [3]
3 phase transformer banks (3-100 kVA and larger)
Regulators
Primary Meter

1) *Every attempt should be made to install storm guys where feasible and practical.*
2) *Refer to the Crossing Multi-Lane Limited Access Highways section for details (pg.4 of 6)*
3) *Contact Storm Secure regional project manager before designing a new multi-circuit line.*

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FPL

Crossing Multi-lane Limited Access Highways

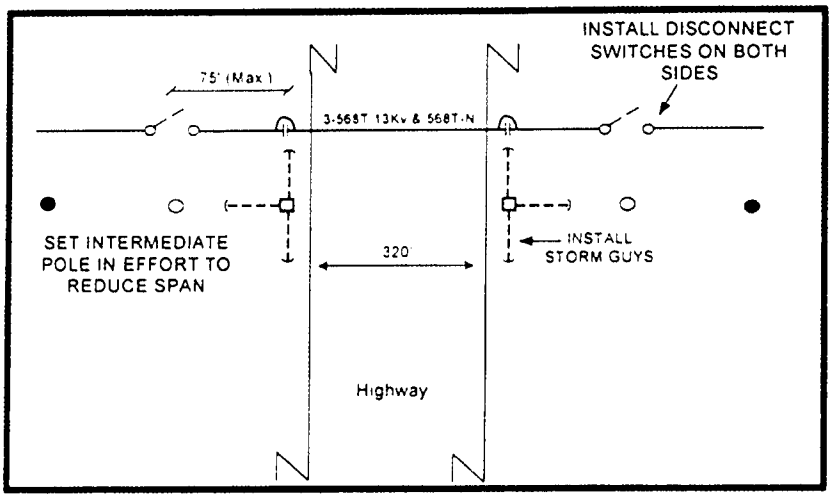
1. Underground installation is the preferred design for all NEW crossings (1, 2 or 3 phase) of multi-lane limited access highways. If underground construction is not feasible or if working on an existing overhead crossing, reference the Overhead Highway Crossing schematic as shown below.

2. Underground crossing for 1 or 2 phases should be designed for potential three phase feeder size cable.

3. For accessible overhead crossings, use concrete poles (III-H or Spun) for the crossing poles and Class 2 wood poles for the adjacent poles. For inaccessible overhead crossings, Class 2 wood poles should be used for the crossing poles and adjacent poles.

4. Every attempt should be made to install storm guys for the highway crossing poles. Storm guys are not required on the adjacent poles.

5. Install disconnect switches on adjacent poles on both sides of the crossing to isolate the feeder section in case of a restoration event. Disconnect switches are to be installed in accessible locations that can be reached with aerial equipment. If there is no load between the nearest existing disconnect switch and the crossing, an additional switch is not required.



Overhead Highway Crossing Schematic

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FPL

Pole Sizing Guidelines

1. The following tables should be used as guidelines to help determine pole class and type, when installing and/or replacing a feeder, lateral or service pole.

2. When performing work that will affect a Top CIF feeder/customer always contact Storm Secure regional project manager prior to design.

Feeder or Three Phase Lateral:

Pole Line Description	New Construction[1]	Existing Infrastructure[2]	Installing or Replacing a Critical Pole[3]
Existing Wood	Use Class 2 Wood Pole to meet EWL	Use Class 2 Wood Poles	Use III-H (Accessible) or Use Class 2 Wood (Inaccessible)
Existing Concrete	Use III-H Concrete Pole to meet EWL	Use III-H Concrete Poles	Use III-H Concrete Poles

Single or Two Phase Lateral:

Pole Line Description	New Construction[1]	Existing Infrastructure[2]	Installing or Replacing a Critical Pole[3]
Existing Wood	Use Class 3 Wood Pole to meet EWL	Use Class 3 Wood Poles	Use III-H (Accessible) or Use Class 2 Wood (Inaccessible)
Existing Concrete	Use III-G[4] or III-H poles to meet EWL	Use III-G[4] or III-H poles to match existing line	Use III-H Concrete Poles

[1] To be used when extending or relocating a pole line. For span length details, see table below.
[2] To be used when replacing a pole or installing an intermediate pole within an existing pole line.
[3] Reference Critical Pole List on pg.3 of 6.
[4] Use of III-G poles should be limited to existing concrete lateral pole lines whose wire size is less than or equal to #1/0 Aluminum.

Facility	Phases(s)	Wire size	Pole size	Recommended Span Length[5] (FPL with 2 attachments – FPL ONLY)		
				105 MPH	130 MPH	145 MPH
Feeder		3#568 ACAR	Class 2	180' - 230'	135' - 200'	100' - 150'
		3#3/0 AAAC	Class 2	180' - 250'	180' - 250'	125' - 250'
Lateral	3 PH	3#1/0 AAAC	Class 2	180' - 250'	180' - 250'	155' - 250'
	2 PH	2#1/0 AAAC	Class 3	180' - 250'	180' - 250'	170' - 250'
	1 PH	1#1/0 AAAC	Class 3	180' - 250'	180' - 250'	180 - 250'

[5]The lower number equates to the maximum span for FPL primary and 2 foreign attachments. The higher number equates to the maximum span for FPL primary only. Reference the addendum DERM tables when adding additional attachment(s) or equipment. Remember to always contact the Storm Secure regional project manager when working on a Top CIF feeder.

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Service / Secondary / Street Light / Outdoor Light Poles

When installing or replacing a secondary, service or street light pole, a minimum Class 4 Wood pole should be used. Specific calculations may require a higher class pole for large Quadruplex wire.

As always, good engineering judgment, safety, reliability, and cost effectiveness should be considered.

In addition to these guidelines, all distribution facilities shall be engineered to meet the minimum requirements set forth in all applicable standards and codes including but not limited to the National Electrical Safety Code (NESC) and Utility Accommodation Guide.

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2007 Hardening Design Guidelines Quick Reference Guide

Feeder or Three Phase Lateral:

Pole Line Description	New Construction[1]	Existing Infrastructure[2]	Installing or Replacing a Critical Pole
Existing Wood	Use Class 2 Wood Pole to meet EWL	Use Class 2 Wood Poles	Use III-H (Accessible) or Use Class 2 Wood (Inaccessible)
Existing Concrete	Use III-H Concrete Pole to meet EWL	Use III-H Concrete Poles	Use III-H Concrete Poles

Single or Two Phase Lateral:

Pole Line Description	New Construction[1]	Existing Infrastructure[2]	Installing or Replacing a Critical Pole
Existing Wood	Use Class 3 Wood Pole to meet EWL	Use Class 3 Wood Poles	Use III-H (Accessible) or Use Class 2 Wood (Inaccessible)
Existing Concrete	Use III-G or III-H poles to meet EWL	Use III-G or III-H poles to match existing line	Use III-H Concrete Poles

[1]To be used when extending or relocating a pole line. For span length details, use the table below.
[2]To be used when replacing a pole or installing an intermediate pole within an existing pole line.

Facility	Phases(s)	Wire size	Pole size	Recommended Span Length[3] (FPL with 2 attachments – FPL ONLY)		
				105 MPH	130 MPH	145 MPH
Feeder		3#568 ACAR	Class 2	180' - 230'	135' - 200'	100' - 150'
		3#3/0 AAAC	Class 2	180' - 250'	180' - 250'	125' - 250'
Lateral	3 PH	3#1/0 AAAC	Class 2	180' - 250'	180' - 250'	155' - 250'
	2 PH	2#1/0 AAAC	Class 3	180' - 250'	180' - 250'	170' - 250'
	1 PH	1#1/0 AAAC	Class 3	180' - 250'	180' - 250'	180 - 250'

[3]The lower number equates to the maximum span for FPL primary and 2 foreign attachments. The higher number equates to the maximum span for FPL primary only. Reference the addendum DERM tables when adding additional attachment(s) or equipment. Remember to always contact the Storm Secure regional project manager when working on a Top CIF feeder. As always, good engineering judgment, safety, reliability, and cost effectiveness should be considered.

Critical Pole Identifier

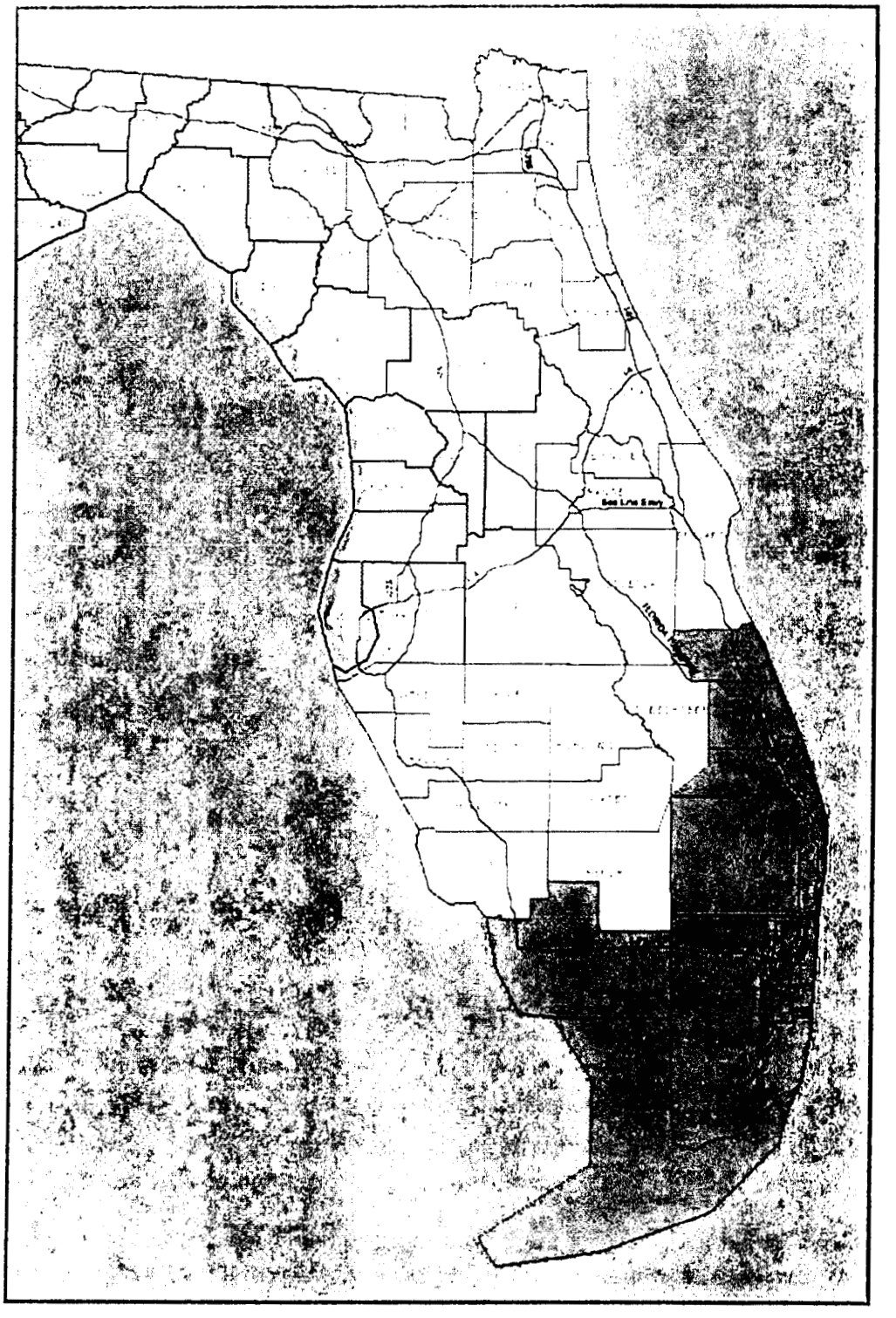
Replace with III-H Square Concrete Pole (Class 2 if inaccessible)

Critical Poles	DCS Reference[4]	Critical Poles	DCS Reference[4]
1st switch out of substation	UH-15.0.0 Fig 2 UH-15.3.1	Automated Feeder Switches (AFS)	C-9.2.0
Interstate Crossings	E-10.0.0 Fig 3	Aerial Auto Transformers	I-9.0.0
Poles with two 3 phase risers	UH-15.2.0	3 phase transformer banks 3 – 100 kVA and larger	I-52.0.2
Multi-circuit poles	Frame as existing	Capacitor Banks	J-2.0.2 & J-2.0.3
Three-phase reclosers	C-8.0.0	Regulators	I-10.1.1
Primary Meter	K-28.0.0		

[4]All references are to the Distribution Construction Standards (DCS).

2007 Hardening Design Guidelines
Quick Reference Guide

105 MPH
130 MPH
145 MPH



Wind Zone	County
130	Alachua
105	Baker
105	Bradford
130	Brevard
145	Broward
130	Charlotte
130	Clay
145	Collier
105	Columbia
145	Miami-Dade
130	De Soto
130	Duval
130	Flagler
130	Glades
130	Hardee
130	Hendry
130	Highlands
145	Indian River
130	Lee
130	Manatee
145	Martin
145	Monroe
130	Nassau
130	Okeechobee
130	Osceola
130	Orange
145	Palm Beach
130	Putnam
130	Sarasota
130	Seminole
130	St Johns
145	St Lucie
105	Suwannee
105	Union
130	Volusia

2007 CIF Customer Circuits Planned for Hardening to EWL

Region	County	CIF Customer
North	Brevard	Cape Canaveral Hospital
	Brevard	Holmes Regional Medical Center
	Brevard	Holmes Regional Medical Center
	Columbia	VA Hospital
	Union	Lake Butler Hospital
	Volusia	Halifax Hospital
	Volusia	Halifax Hospital
East	Palm Beach	Bethesda Memorial Hospital
	Palm Beach	Columbia Hospital
	Palm Beach	Good Samaritan Hospital
	Palm Beach	Good Samaritan Hospital
	Palm Beach	VA Hospital
	St Lucie	St. Lucie Medical Center
	St Lucie	FPL System Critical
South	Broward	Cleveland Clinic
	Broward	Florida Medical Center
	Broward	Imperial Point Medical Center
	Broward	Memorial Regional Hospital
	Miami-Dade	Aventura Hospital
	Miami-Dade	Aventura Hospital
	Miami-Dade	Baptist Hospital
	Miami-Dade	Baptist Hospital
	Miami-Dade	Coral Gables Hospital
	Miami-Dade	Jackson South Community Hospital
	Miami-Dade	Larkin Community Hospital
	Miami-Dade	Mercy Hospital
	Miami-Dade	North Shore Medical Center
	Miami-Dade	Palmetto General Hospital
	Miami-Dade	Parkway Regional Medical Center
	Miami-Dade	FPL System Critical (3)
West	Collier	Naples Community Hospital
	Lee	Lee Memorial Hospital
	Manatee	Blake Medical Center
	Manatee	Manatee Memorial Hospital
	Manatee	Manatee Memorial Hospital
	Sarasota	Sarasota Memorial Hospital

2007 Community Project feeders planned for Incremental Hardening

Region	County	Feeder Number
East	Martin	401133
	Martin	407164
	Martin	408764
	Palm Beach	400433
	Palm Beach	400537
	Palm Beach	402831
	Palm Beach	403931
	Palm Beach	404032
	Palm Beach	405265
	Palm Beach	408032
	Palm Beach	409631
	Palm Beach	410663
	West Palm	407736
South	Broward	700139
	Broward	700440
	Broward	700639
	Broward	700937
	Broward	701931
	Broward	702033
	Broward	703032
	Broward	703631
	Broward	705866
	Broward	706533
	Broward	707663
	Miami-Dade	800432
	Miami-Dade	802431
	Miami-Dade	803938
	Miami-Dade	804432
	Miami-Dade	807034
	Miami-Dade	807431
	Miami-Dade	807834
	Miami-Dade	808268
	Miami-Dade	808269
	Miami-Dade	809036

Distribution Engineering Reference Manual

FPL *Section 4 – Overhead Line Design*

Distribution Engineering Reference Manual (DERM)

Section 4 – Overhead Line Design

ADDENDUM FOR EXTREME WIND LOADING

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Storm Secure

Distribution Overhead Line Design for Extreme Wind Loading

ADDENDUM TO DISTRIBUTION ENGINEERING REFERENCE MANUAL (DERM)

Introduction

In 2006, FPL introduced the concept of "STORM SECURE". One part of this concept is to harden the electrical system by adopting new standards based on extreme wind velocity criteria. The Florida Public Service Commission and the Florida Administrative Code have adopted the 2007 NESC for the applicable standard of construction.

FPL designs its distribution facilities based on the loading as specified in the 2007 National Electrical Safety Code (NESC) using Grade B Construction. The NESC specifies three weather conditions to consider for calculating loads:

Rule 250 B. Combined ice and wind loading (FPL current standard construction)
Rule 250 C. Extreme wind loading
Rule 250 D. Extreme ice with concurrent wind loading (this is a new loading condition in the 2007 NESC that will not impact FPL).

Prior to the hardening effort, FPL has been designing overhead distribution using the loads calculated under Rule 250 B. This addendum provides the designers the information needed to design projects using Rule 250 C, grade B (extreme wind loading) to calculate the loads, when it is determined that the particular pole line is to be designed to meet extreme wind loading (EWL) requirements. The NESC extreme wind map identifies 7 Basic Wind Speeds throughout Florida. In order to minimize the design effort to accommodate these 7 wind speeds, FPL has created 3 wind regions with designated wind speeds of 105 mph, 130 mph, and 145 mph. The Map shown in Figure 4.2.2-1 identifies the counties within our service territory that fall into the 3 wind regions. Whenever extreme wind designs are deployed, they will be designed to the identified wind speed for the location of the work to be done.

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4.2.2 Poles Structures and Guying

A. Poles, General Information

1. *Pole Brands*

The pole brand includes the pole length & class, the type of treatment, the manufacturer, the date the pole was manufactured and FPL.
Wood Poles –This brand is located at 15' from the bottom of the pole.
Square (cast) Concrete poles – the brand up until 2007 was located 15' from the bottom. New specifications now require the brand to be at 20' from the bottom of the pole.
Distribution Spun Concrete poles – The brand information is on a metal tag that is located 20' from the bottom of the pole.

2. *Design Specifications*

The NESC specifies 3 Grades of construction: Grade B, Grade C, and Grade N with Grade B being the strongest of the three. These grades of construction are the basis for the required strengths for safety. FPL uses Grade B Construction for all distribution facilities. This means that the calculated loads must be multiplied by "Load Factors" and the calculated or specified strength of structures must be multiplied by "Strength Factors". The Strength multiplied by the Strength Factor (SF) must be equal to, or greater than the Load multiplied by the Load Factor (LF).

Equation 4.2.2-1

$$\textit{Strength} \times \textit{Strength Factor} \geq \textit{Load} \times \textit{Load Factor}$$

Table 4.2.2 – 1 below lists the Load Factors and Strength Factors for Grade B Construction from NESC Table 253-1 and Table 261-1A.

Table 4.2.2 - 1 Extreme Wind
Strength Factors & Load Factors

Strength of	Strength Factor
Wood Poles	0.75
Concrete Poles	1.00
Composite Poles	1.00
Support Hardware	1.00
Guy Wire	0.90
Guy Anchor and Foundation	1.00
	Load Factor
Extreme Wind Loads	1.00

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FPL uses the NESC Extreme Wind Loading for its design criteria. As such, identify the wind speed for the job location and determine the load based on the following formula.

Equation 4.2.2-2

$$Load\ in\ pounds = 0.00256 \times (V_{mph})^2 \times k_z \times G_{RF} \times I \times C_f \times A(ft^2)$$

Where,

0.00256 - Velocity-Pressure Numerical Coefficient
V -Velocity of wind in miles per hour (3 second gust)
k_z -Velocity Pressure Exposure Coefficient
G_{RF} -Gust Response Factor
I -Importance Factor, 1.0 for utility structures and their supported facilities.
C_f - Force Coefficient (Shape Factor)
For Wood & Spun Concrete Poles = 1.0
For Square Concrete Poles = 1.6
A - Projected Wind Area, ft^2.

The NESC provides formulas for calculating k_z and G_{RF}. However, Tables are also provided and Table 4.2.2-2 below shows the values needed for most distribution structures.

Table 4.2.2-2 Velocity pressure Exposure coefficient (k_z) and Gust Response Factors (G_{RF})

	Structure		Equipment		Wire		
Height (h)	k_z [1]	G_{RF} [4]	k_z [2]	G_{RF} [5]	k_z [3]	G_{RF} [4] (L ≤ 250 ft)	G_{RF} [4] (250 < L ≤ 500 ft)
≤ 33	0.9	1.02	1.0	1.02	1.0	0.93	0.86
>33 to 50	1	0.97	1.1	0.97	1.1	0.88	0.82
>50 to 80	1.1	0.93	1.2	0.93	1.2	0.86	0.80

1. h for the pole k_z is to be the height of the pole above ground
2. h for the equipment k_z is the height of the center of the area of the equipment above ground
3. h for the wire k_z is the height of the wire above ground
4. h for the G_{RF} is the height above ground for the structure and the wire
5. h for the G_{RF} for the equipment is based on the height of the structure above ground
6. L = design wind span (average of span on both sides of structure)

The wind speeds to be used are shown in Figure 4.2.2 – 1

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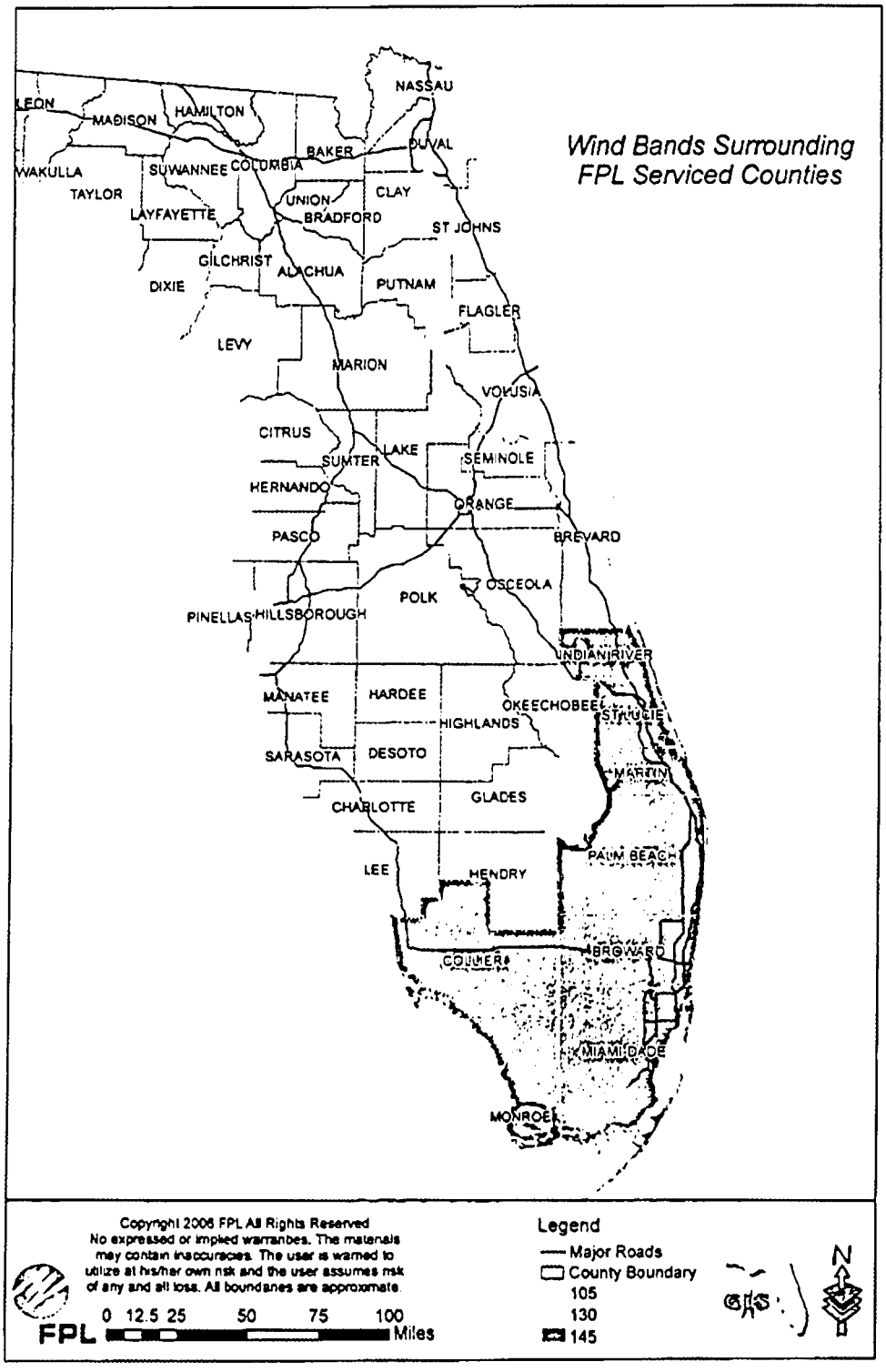
Figure 4.2.2 –1 Wind Regions by County



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3. *Wood Pole Strength*

The strength of wood poles is specified in the American National Standard – ANSI O5.1-2002. In addition to strength of wood poles, this standard specifies dimensions, shape, sweep spiral grain, knots, and many other characteristics of wood poles.

A change from previous calculations shown in the DERM for allowable pole strength is that the circumference to be used is now considered to be the ground line circumference rather than the "fixity" point circumference. Another change is the strength factor to be used. For extreme wind the strength factor for wood poles is 0.75 (see Table 4.2.2-1)

Example 4.2.2-1:

Determine the pole strength for wind loading on a 45'/2 wood pole that is set 7 feet.

Equation 4.2.2-3 $M_r = 0.000264fC^3$

Where

M_r	=	Moment (ultimate or long term bowing) measured in foot-pounds
f	=	Fiber Stress (8000 or 1000 psi for Southern Yellow Pine)
C	=	Circumference at ground Line

From Table G (DERM 4.2.2) circumference at Ground line = 40.1 inches

$M_r = 0.000264 \times (8{,}000) \times (40.1)^3 = 136{,}184$ ft.-lbs.

This is the strength for the 45'/2 wood pole. However for design, apply the NESC Strength Factor of 0.75.

The strength of the 45'/2 wood pole = 136,184 x 0.75 = 102,138 ft.-lbs.

4. *Concrete Pole Strength*

The strength of concrete poles is based on the application of a designated load at a specified location on the pole. This load is measured in KIPS = 1,000 pounds per KIP. A 5 KIP pole is rated based on applying 5,000 pounds of load at two feet below the top of the pole. Most distribution

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poles are rated by applying the load at two feet down from the top. However, for the type "O", "S", and "SU" poles, this load is applied at one foot down from the top. Like wood poles, concrete poles have a continuous rating (loads that are always on the pole) and a temporary rating (wind loads that come and go). Spun concrete poles (unlike other FPL distribution concrete poles) are designated by their KIP rating rather than a type (i.e., O, S, SU, III, III-G, III- H). Table 4.2.2-3 List the ratings (in KIPS) for the various concrete poles.

Table 4.2.2-3 Concrete Pole Ratings

Pole Type	Temporary Rating	Continuous Rating
O	0.85	0.26
S & SU	0.90	0.30
III	1.30	0.56
III-A	1.30	0.60
III-G	2.40	0.90
III-H	4.20	1.20
12 KIP (square)	8.40	2.40
Spun Concrete		
4.0 KIP	4.00	1.73
4.7 KIP	4.70	2.54
5.0 KIP	5.00	3.03

To calculate the strength of the pole use the following:

For O, S, SU,

M_r = Rating (Table 4.2.2-3) x (Pole Length – setting depth - 1 foot)

Example: 35' Type SU for extreme wind loading

M_r = 0.9 KIPS x (35 – 7.5 - 1) = 23,850 ft-lbs

For III, III-A, III-G, III-H

M_r = Rating (Table 4.2.2-3) x (Pole Length – setting depth - 2 feet)

Example: 50' Type III-H for extreme wind loading

M_r = 4.2 KIPS x (50 – 11.5 – 2)) = 153,300 ft-lbs

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For Spun Concrete

M_r = Rating (Table 4.2.2-3) x (Pole Length – setting depth - 2 feet)

Example: 50'/ 4.7 KIP for extreme wind loading

M_r = 4.7 KIPS x (50 – 11 - 2) = 173,900 ft-lbs

For pre-stressed concrete poles, the NESC extreme wind strength factor = 1.0. The values calculated above will be the correct strength for concrete poles.

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B. Wind Loading

1. *Wind Loading on poles.*

To calculate the wind load on the pole (see DERM 4.2.2 C3.a):

a. Calculate the area of the pole exposed to the wind

Equation 4.2.2-4 $$A = H_1(\frac{a+b}{2})(\frac{1}{12}'')$$

A = projected area above ground line in square feet.
H_1 = the pole's height above the ground line in feet.

For wood and spun concrete poles,
a = diameter at top of pole in inches.
b = diameter of pole at ground line in inches.

For square concrete poles, dimensions a and b are the widths of one face at top and ground line respectively.

b. Calculate the center of the area.

Equation 4.2.2-5 $$H_{CA} = \frac{H_1(b+2a)}{3(b+a)}$$

H_{CA} is used to calculate the ground line moment due to the wind force.

c. Calculate the wind force acting on the area (see Equation 4.2.2-2 with explanation of terms)

Load in pounds = $0.00256 \cdot (V_{mph})^2 \cdot k_z \cdot G_{RF} \cdot I \cdot C_f \cdot A(ft^2)$

Example Calculation for Wood Pole

Pole Length/Class = 45'/2
Setting depth = 7' (from DCS D-3.0)
Wind Region = 145 mph

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$$Projected\ Area.\ A = H_1(ft.)\,x\,\frac{1\,ft}{12\,in}\,x\left[\frac{a+b(inches)}{2}\right]$$

From Table G, Page 71, the circumference at the top of a 45'/2 pole is 25",

$$a = \frac{25"}{\pi} = 7.96"$$

The circumference at 38 ft. below the pole top $40.1", b = \frac{40.1"}{\pi} = 12.76"$

$$A = \frac{38}{12}\,x\left[\frac{7.96+12.76}{2}\right] = 32.81\,sq.\,ft.$$

$$Height\ of\ center\ of\ area,\ H_{CA} = \frac{H_1(b+2a)}{3(b+a)} = \frac{38(12.76+15.92)}{3(12.76+7.96)}$$

$H_{CA} = Moment\ Arm = 17.53\ ft.$

Wind Load on Pole =

$0.00256 \times (145)^2 \times 1.0 \times 0.97 \times 1.0 \times 1.0 \times 32.81 =$ **1713 lbs**

Where:

k_z is based on h = 38'; $k_z = 1.0$

G_{RF} is based on h = 38'; $G_{RF} = 0.97$

$C_f = 1.0$ for wood and spun concrete poles

$C_f = 1.6$ for square concrete poles

This load must then be multiplied by the Load Factor, which for extreme wind equals 1.0 and the moment arm to obtain the Ground Line Moment (M_P) of the wind acting on the pole only.

Equation 4.2.2-6

M_P = *Wind Load x Load Factor x Moment Arm.*

M_P = 1713 lbs x 1 x 17.53 ft. = 30,030 ft. lbs.

The strength of this pole, previously calculated is 102,138 ft.-lbs. The pole itself has used up 29% (30,030/102,138) of its capacity for 145 mph extreme wind. Subtracting the wind load from the strength leaves 72,108 ft-lbs (102,138 – 30,030) for conductors and other attachments.

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Example Calculation for Square Concrete Pole

Pole Length/Class = 50'/III-H
Setting depth = 11.5' (from DCS D-3.0)
Wind Region = 145 mph

$$Projected\ Area.\ A = H_1(ft.)\,x\,\frac{1\,ft}{12\,in}\,x\left[\frac{a+b(inches)}{2}\right]$$

From Table H, the width of the pole at the top a = 9.00"
The width at ground line, b = 15.75"

$$A = \frac{38.5}{12}\,x\left[\frac{15.75+9.00}{2}\right] = 39.70\,sq.\,ft.$$

$$Height\ of\ center\ of\ area,\ H_{CA} = \frac{H_1(b+2a)}{3(b+a)} = \frac{38.5(15.75+18.00)}{3(15.75+9.00)}$$

$$H_{CA} = Moment\ Arm = 17.5\ ft.$$

Wind Load on Pole =
$0.00256 \times (145)^2 \times 1.0 \times 0.97 \times 1.0 \times 1.6 \times 39.7$ = **3317 lbs**
Where:
k_z is based on h = 38.5'; k_z = 1.0
G_{RF} is based on h = 38.5'; G_{RF} = 0.97
C_f = 1.0 for wood and spun concrete poles
C_f = 1.6 for square concrete poles

This load must then be multiplied by the Load Factor, which for extreme wind equals 1.0 and the moment arm to obtain the Ground Line Moment (M_P) of the wind acting on the pole only.

M_P = Wind Load x Load Factor x Moment Arm.
M_P = 3317 lbs x 1 x 17.5 ft. = 58,040 ft. lbs.

The strength of this pole, previously calculated is 153,300 ft.-lbs. The pole itself has used up 38% (58,040/153,300) of its capacity for 145 mph extreme wind. Subtracting the wind load from the strength leaves 95,260 ft-lbs (153,300 – 58,040) for conductors and other attachments.

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Example Calculation for Spun Concrete Pole

Pole Length/Class = 50'/4.7 KIP
Setting depth = 11' (from DCS D-3.0)
Wind Region = 145 mph

$$Projected\ Area.\ A = H_1(ft.)\,x\,\frac{1\,ft}{12\,inc.}\,x\left[\frac{a+b(inches)}{2}\right]$$

From Table H, the diameter of the pole at the top a = 9.55"
The diameter at ground line, b = 16.57"

$$So\ A = \frac{39}{12}\,x\left[\frac{9.55+16.57}{2}\right] = 42.45\,sq.\,ft.$$

$$Height\ of\ center\ of\ area, H_{CA} = \frac{H_1(b+2a)}{3(b+a)} = \frac{39(16.57+19.1)}{3(16.57+9.55)}$$

$$H_{CA} = Moment\ Arm = 17.75\ ft.$$

Wind Load on Pole =
0.00256 x $(145)^2$ x 1.0 x 0.97 x 1.0 x 1.0 x 42.45 = **2,216 lbs**
Where:
k_z is based on h = 39'; k_z = 1.0
G_{RF} is based on h = 39'; G_{RF} = 0.97
C_f = 1.0 for wood and spun concrete poles
C_f = 1.6 for square concrete poles

This load must then be multiplied by the Load Factor, which for extreme wind equals 1.0 and the moment arm to obtain the Ground Line Moment (M_P) of the wind acting on the pole only.

M_P = Wind Load x Load Factor x Moment Arm.
M_P = 2,216 lbs x 1 x 17.75 ft. = 39,341 ft. lbs.

The strength of this pole, previously calculated is 173,900 ft.-lbs. The pole itself has used up 23% (39,341/173,900) of its capacity for 145 mph extreme wind. Subtract the wind load from the strength leaves 134,559 ft-lbs (173,900 – 39341) for conductors and other attachments.

Table 4.2.2-4 Lists the allowable groundline moments for various pole sizes.

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Table 4.2.2-4 Allowable Ground Line Moments

Wood Poles (in earth)				
Pole Size	Setting Depth	Allowable Moment for Attachments at Designated Wind Speeds		
		105 mph	**130 mph**	**145 mph**
35/5	6	32178	28738	26324
35/4	6	42429	38656	36007
40/5	6.5	36936	31956	28460
40/4	6.5	48263	42812	38986
40/3	6.5	61567	55646	51489
40/2	6.5	76998	70607	66119
45/3	7	66363	58624	53190
45/2	7	86391	78000	72108
50/2	7	93535	82611	74941
55/2	7.5	99693	86174	76682
60/1	8	131634	113020	99951

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Table 4.2.2-4 Allowable Ground Line Moments (cont.)

Square Concrete Poles (in earth)				
Pole Size	Setting Depth	Allowable Moment for Attachments at Designated Wind Speeds		
		105 mph	**130 mph**	**145 mph**
35/Type O	7	15426	11417	8602
35/SU	7.5	15323	10778	7588
35/III-G	9	48907	44275	41022
40/III-A	10	23777	17050	12327
40/III-G	9	56781	49950	45154
40/III-H	11.5	96450	88537	82981
40/12 KIP	13	191480	181610	174681
45/III-A	10	24142	14146	7127
45/III-G	9	62676	52592	45511
45/III-H	11.5	110053	98198	89874
45/12 KIP	13.5	222175	208520	198933
50/III-A	10	24111	10635	1173
50/III-G	9.5	67701	54539	45297
50/III-H	11.5	123164	107106	95831
50/12 KIP	13.5	252789	233067	219219
55/III-G	9.5	72176	55004	42947
55/III-H	12	133764	113283	98902
55/12 KIP	14	280155	254873	237121
60/III-H	12	144138	117993	99637
60/12 KIP	14	308835	276454	253719
65/III-H	12	149613	115197	91032

Spun Concrete Poles (in earth)				
Pole Size	Setting Depth	Allowable Moment for Attachments at Designated Wind Speeds		
		105 mph	**130 mph**	**145 mph**
50/4.7 KIP	11	153270	142277	134559
55'/4.7 KIP	12	167116	153482	143910
60'/5.0 KIP	12.5	190953	171477	157803
65'/5.0 KIP	13	202928	177845	160233
70'/5.0 KIP	13.5	214369	183392	161642

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2. ***Wind Loading on conductors.***

The wind loading on conductors is calculated in a similar method to the wind loading on the pole. The load in pounds per conductor uses Equation 4.2.2-2 with the appropriate factors for the attachment heights a shown in Table 4.2.2-2.

To calculate the wind load on the conductor:

a. Determine the wind region (105 mph, 130 mph, or 145 mph)
b. Calculate the attachment height to determine the k_z *and* G_{RF} (Table 4.2.2-2)
c. The Importance Factor (I) and the Force Coefficient (C_f) are both equal to 1 for conductors.
d. Calculate the area per foot of conductor
e. Calculate the wind load per foot of conductor
f. Calculate the total wind load on the conductor for the length of conductor exposed to the wind (Average of the Spans on either side of the pole).

Example:
Determine the wind load on a 170 foot length [(180'span + 160'span)/2] of 568.3 ACAR conductor that is attached at 30 feet above the ground in the 145 mph wind region.
From Table 4.2.2-2:

$K_z = 1.0$
$G_{RF} = 0.93$

Calculate the area per foot of conductor
Diameter = 0.879 inches (ref DCS F-7.0.0)

For a 1 foot length of conductor:
Projected Area.

$$A = 1(ft.)x\left[\frac{Conductor\ Diameter(inches)}{12(inches/ft)}\right]$$

$$A = 1(ft.)x\left[\frac{0.879(inches)}{12(inches/ft)}\right]$$

A = 0.073 Square Ft. for each foot of span length

The wind load in pounds per foot of span length (from Equation 4.2.2-2) is

$$Load\ in\ pounds = 0.00256\ x\ (Vmph)^2\ x\ k_z\ x\ G_{RF}\ x\ I\ x\ C_f\ x\ A(ft^2)$$

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Load in pounds = 0.00256 x $(145)^2$ x 1 x .93 x 1 x 1 x .073
Load = 3.667 pounds per foot

Total Load = Length of conductor x Load per foot of conductor
= 170 x 3.667
Total Load = 623.3 pounds

This is the load that the wind exerts on the conductor attached at 30 above ground. This load will have to be applied to the pole to determine if the pole has the strength to support the load.

The wind load per foot of conductor for the three wind regions can be found in Table 4.2.2-5, Table 4.2.2- 6 and Table 4.2.2-7.

3. ***Wind Loading on equipment.***
The wind loading on equipment is calculated in a similar method to the wind loading on the pole and the conductors. The load in pounds uses Equation 4.2.2-2 with the appropriate factors for the attachment heights a shown in Table 4.2.2-2 and the area of the equipment.

To calculate the wind load on the equipment:

a. Determine the wind region (105 mph, 130 mph, or 145 mph)
b. Calculate the attachment height to determine the k_z (Table 4.2.2-2) (For equipment, use the top mounting hole of the equipment bracket.)
c. Use the height of the pole above ground to determine G_{RF} (Table 4.2.2-2)
d. The Importance Factor (I) is equal to 1.
e. The Force Coefficient (C_f) is equal to 1.0 for cylindrical equipment and 1.6 for rectangular equipment.
f. Calculate the area of the equipment
g. Calculate the wind load on the equipment

Example:
Determine the wind load on a 50 kVA transformer mounted at 28 feet on a pole that is 38 feet above the ground in the 145 mph wind region.

From Table 4.2.2-2:
K_z = 1.0 (Equipment ≤ 33' above ground)
G_{RF} = 0.97 (Equipment based on Pole height > 33' to 50' above ground)
C_f = 1.0
A = 4.44 square feet

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The wind load in pounds from Equation 4.2.2-2 is

$$Load\ in\ pounds = 0.00256 \times (Vmph)^2 \times k_z \times G_{RF} \times I \times C_f \times A(ft^2)$$

Load in pounds = $0.00256 \times (145)^2 \times 1 \times .97 \times 1 \times 1 \times 4.44$
Load = 231.8 pounds

This is the load that the wind exerts on the transformer attached at 28 feet above ground. This load will have to be applied to the pole to determine if the pole has the strength to support the load.
The wind load on equipment for the three wind regions can be found in Table 4.2.2-5 (105 mph), Table 4.2.2- 6 (130 mph) and Table 4.2.2-7 (145 mph).

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Table 4.2.2-5 Wind Force on Conductors & Equipment

Wind Speed = 105 mph
CONDUCTORS

		Force in pounds per foot Conductor Height Above Ground		
Conductor	Diameter	≤33'	>33' to 50'	>50' to 80'
568.3 MCM ACAR	0.879	1.923	2.001	2.134
3/0 AAAC	0.502	1.098	1.143	1.218
1/0 AAAC	0.398	0.871	0.906	0.966
#4 AAAC	0.250	0.547	0.569	0.607
3/0 TPX	1.238	2.708	2.819	3.005
1/0 TPX	1.026	2.244	2.336	2.490
6 DPX	0.496	1.085	1.129	1.204
CATV				
Feeder w/1/4"Msgnr	0.750	1.641	1.708	1.820
Trunk w/1/4"Msgnr	1.000	2.187	2.277	2.427
Telephone				
100 pr (24 GA BKMS) Self-Support	0.960	2.100	2.186	2.330
600 pr (24 GA BKMA w/3/8" Msgnr	2.295	5.020	5.225	5.571

Wind Speed = 105 mph
EQUIPMENT

		Pole Height in same range as Equipment Force in pounds at top mounting Bolt Height Above Ground			Pole height >33' to 50' Equipment Ht
Transformers	Sq. Ft.	≤33'	>33' to 50'	>50' to 80'	≤33'
25	3.75	108.0	112.9	118.1	102.7
50	4.44	127.8	133.7	139.9	121.6
75	4.81	138.5	144.9	151.5	131.7
100	6.55	188.6	197.3	206.3	179.3
167	10.83	311.8	326.1	341.1	296.5
Capacitors					
Switched (1)	19.91	573.2	599.6	627.1	545.1
Fixed (1)	16.89	486.2	508.6	532.0	462.4
Reclosers					
1 phase	4.00	115.2	120.5	126.0	109.5
3 phase (1)	16.89	486.2	508.6	532.0	462.4
Automation Switches					
Joslyn	8.89	255.9	267.7	280.0	243.4
Cooper	10.56	304.0	318.0	332.6	289.1
S&C	15.60	449.1	469.8	491.4	427.1
Riser - PVC U-Guard		Force in pounds per foot of riser Height Above Ground			
2" U-Guard	0.19	5.4	5.6	5.9	5.1
5" U-Guard	0.46	12.8	13.8	14.4	13.2

(1) The 1.6 C_f factor for rectangular shape is included in the Area shown for Capacitors and 3 Phase Recloser

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Table 4.2.2-6 Wind Force on Conductors & Equipment

Wind Speed = 130 mph
CONDUCTORS

		Force in pounds per foot Conductor Height Above Ground		
Conductor	Diameter	≤33'	>33' to 50'	>50' to 80'
568.3 MCM ACAR	0.879	2.947	3.068	3.270
3/0 AAAC	0.502	1.683	1.752	1.868
1/0 AAAC	0.398	1.334	1.389	1.481
#4 AAAC	0.250	0.838	0.872	0.930
3/0 TPX	1.238	4.151	4.321	4.606
1/0 TPX	1.026	3.440	3.581	3.817
6 DPX	0.496	1.663	1.731	1.845
CATV				
Feeder w/1/4"Msgnr	0.750	2.515	2.617	2.791
Trunk w/1/4"Msgnr	1.000	3.353	3.490	3.721
Telephone				
100 pr (24 GA BKMS) Self-Support	0.960	3.219	3.350	3.572
600 pr (24 GA BKMA w/3/8" Msgnr	2.295	7.695	8.009	8.539

Wind Speed = 130 mph
EQUIPMENT

		Pole Height in same range as Equipment Force in pounds at top mounting Bolt Height Above Ground			Pole height >33' to 50' Equipment Ht
Transformers	Sq. Ft.	≤33'	>33' to 50'	>50' to 80'	≤33'
25	3.75	165.5	173.1	181.1	157.4
50	4.44	195.9	205.0	214.4	186.3
75	4.81	212.3	222.0	232.2	201.9
100	6.55	289.0	302.4	316.3	274.9
167	10.83	477.9	499.9	522.9	454.5
Capacitors					
Switched (1)	19.91	878.6	919.1	961.3	835.5
Fixed (1)	16.89	745.3	779.7	815.5	708.8
Reclosers					
1 phase	4.00	176.5	184.7	193.1	167.9
3 phase (1)	16.89	745.3	779.7	815.5	708.8
Automation Switches					
Joslyn	8.89	392.3	410.4	429.2	373.1
Cooper	10.56	466.0	487.5	509.9	443.2
S&C	15.60	688.4	720.1	753.2	654.7
Riser - PVC U-Guard		Force in pounds per foot of riser Height Above Ground			
2" U-Guard	0.19	8.3	8.7	9.1	7.9
5" U-Guard	0.46	20.2	21.2	22.1	19.2

(1) The 1.6 C_f factor for rectangular shape is included in the Area shown for Capacitors and 3 Phase Recloser

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Table 4.2.2-7 Wind Force on Conductors & Equipment

Wind Speed = 145 mph
CONDUCTORS

		Force in pounds per foot Conductor Height Above Ground		
Conductor	Diameter	≤33'	>33' to 50'	>50' to 80'
568.3 MCM ACAR	0.879	3.667	3.816	4.069
3/0 AAAC	0.502	2.094	2.180	2.324
1/0 AAAC	0.398	1.660	1.728	1.842
#4 AAAC	0.250	1.043	1.085	1.157
3/0 TPX	1.238	5.164	5.375	5.731
1/0 TPX	1.026	4.280	4.455	4.749
6 DPX	0.496	2.069	2.154	2.296
CATV				
Feeder w/1/4"Msgnr	0.750	3.129	3.256	3.472
Trunk w/1/4"Msgnr	1.000	4.171	4.342	4.629
Telephone				
100 pr (24 GA BKMS) Self-Support	0.960	4.005	4.168	4.444
600 pr (24 GA BKMA w/3/8" Msgnr	2.295	9.573	9.964	10.623

Wind Speed = 145 mph
EQUIPMENT

		Pole Height in same range as Equipment Force in pounds at top mounting Bolt Height Above Ground			Pole height >33' to 50' Equipment Ht
Transformers	Sq. Ft.	≤33'	>33' to 50'	>50' to 80'	≤33'
25	3.750	205.9	215.4	225.3	195.8
50	4.440	243.8	255.0	266.7	231.8
75	4.810	264.1	276.2	288.9	251.1
100	6.550	359.6	376.2	393.4	342.0
167	10.830	594.6	622.0	650.5	565.4
Capacitors					
Switched (1)	19.910	1093.1	1143.4	1195.9	1039.5
Fixed (1)	16.890	927.3	970.0	1014.5	881.8
Reclosers					
1 phase	4.000	219.6	229.7	240.3	208.8
3 phase (1)	16.890	927.3	970.0	1014.5	881.8
Automation Switches					
Joslyn	8.890	488.1	510.6	534.0	464.1
Cooper	10.560	579.7	606.5	634.3	551.3
S&C	15.600	856.4	895.9	937.1	814.5
Riser - PVC U-Guard		Force in pounds per foot of riser Height Above Ground			
2" U-Guard	0.188	10.3	10.8	11.3	9.8
5" U-Guard	0.458	25.2	26.3	27.5	23.9

(1) The 1.6 C_f factor for rectangular shape is included in the Area shown for Capacitors and 3 Phase Recloser

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The methodology to determine if a pole has the strength for a specific design or to determine the maximum span distance a specific size pole can support for framing, is the same as shown in the DERM 4.2.2 pages 12-15. The examples shown below show the calculations based on using the new tables for extreme wind loading. Note that the ground line is now the point used for the calculations rather than the "fixity" point.

Example:

Conductor: 3-568.3 MCM ACAR and #3/0 AAAC - Neutral
Framing: DCS page E-5.0.0 (Modified Vertical) and I-41.0.1 (for single phase transformer)
Transformer: 50 kVA
CATV: Trunk
Telephone: 1-600 pair, 24 gauge, BKMA
Average Span Length = 150 feet
Attachment heights must be calculated using the framing identified and the pole setting depths as shown in the Revised DCS page D-3.0.0

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Case I: Determine if a 45'/2 wood pole is strong enough for this design.

Calculate the moments on the pole.

CONDUCTORS	Number of Conductors	x	Wind Load Per Ft. (Table 4.2.2-7)	x	Avg. Span Length	x	Height Above Ground	=	MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	150	x	39.00	=	22324
568.3	1	x	3.816	x	150	x	36.60	=	20950
568.3	1	x	3.816	x	150	x	34.60	=	19805
Neut., Sec., St Lt									
3/0	1	x	2.094	x	150	x	29.4	=	9235
CATV - PROPOSED									
Trunk	1	x	4.171	x	150	x	23.6	=	14765
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	150	x	22.6	=	32452
							TOTAL MOMENT DUE TO CONDUCTOR	=	119531
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		29.9	=	6931
							TOTAL MOMENT DUE TO EQUIPMENT	=	6931 ft.-lb.
							TOTAL ALL MOMENTS	=	**126462 ft.-lb.**

From Table 4.2.2-4, the allowable moment for attachments to a 45'/2 wood pole in a 145 mph wind region is 72,108 ft-lbs. A 45'/2 wood pole cannot be used.

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Case II: Determine if a 50'/III-H square concrete pole is strong enough for this design

DCS D-3.0.0 shows a revised setting depth for square concrete poles. The new setting depth is generally 5 feet deeper than previous. A 50'/III-H square concrete pole is set 11.5 feet deep.

Re-calculate the moments based on attachment heights.

CONDUCTORS	Number of Conductors		Wind Load Per Ft. (Table 4.2.2-7)		Avg. Span Length		Height Above Ground		MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	150	x	39.50	=	22610
568.3	1	x	3.816	x	150	x	37.08	=	21225
568.3	1	x	3.816	x	150	x	35.08	=	20080
Neut., Sec., St Lt									
3/0	1	x	2.094	x	150	x	29 92	=	9398
CATV - PROPOSED									
Trunk	1	x	4.171	x	150	x	24.08	=	15066
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9 573	x	150	x	23.08	=	33142
							TOTAL MOMENT DUE TO CONDUCTOR	=	121519
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		30.42	=	7051
							TOTAL MOMENT DUE TO EQUIPMENT	=	7051 ft.-lb.
							TOTAL ALL MOMENTS	=	**128571 ft.-lb.**

From Table 4.2.2-4, the allowable moment for attachments to a 50'/III-H square concrete pole in a 145 mph wind region is 95,831 ft-lbs. A 50'/III-H square concrete pole cannot be used.

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Case III: Determine if a 50'/4.7 KIP spun concrete pole is strong enough for this design.

DCS D-3.0.0 shows the setting depths for spun concrete poles. A 50'/4.7 KIP spun concrete pole is set 11 feet deep.

Re-calculate the moments based on attachment heights.

CONDUCTORS	Number of Conductors	x	Wind Load Per Ft. (Table 4.2.2-7)	x	Avg. Span Length	x	Height Above Ground	=	MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	150	x	40.00	=	22896
568.3	1	x	3.816	x	150	x	37.58	=	21511
568.3	1	x	3.816	x	150	x	35.58	=	20366
Neut., Sec., St Lt									
3/0	1	x	2.094	x	150	x	30.42	=	9555
CATV - PROPOSED									
Trunk	1	x	4.171	x	150	x	24.58	=	15378
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	150	x	23.58	=	33860
							TOTAL MOMENT DUE TO CONDUCTOR	=	123566
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		30.92	=	7167
							TOTAL MOMENT DUE TO EQUIPMENT	=	7167 ft.-lb.
							TOTAL ALL MOMENTS	=	**130733 ft.-lb.**

From Table 4.2.2-4, the allowable moment for attachments to a 50'/4.7 KIP spun concrete pole in a 145 mph wind region is 134,559 ft-lbs. A 50'/4.7 KIP spun concrete pole can be used.

Using similar calculations from DERM 4.2.2 page 13, the maximum span distance for each of the poles above can be determined.

Determine the moment due to 1 foot of conductor moments
Subtract the moment due to the transformer from the total allowable moment
Divide the remaining allowable moment by the total 1 foot conductor moments.

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ADDENDUM FOR EXTREME WIND LOADING

CONDUCTORS	Number of Conductors	x	Wind Load Per Ft. (Table 4.2.2-7)	x	Avg. Span Length	x	Height Above Ground	=	MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	1	x	39.00	=	149
568.3	1	x	3.816	x	1	x	36.60	=	140
568.3	1	x	3.816	x	1	x	34.60	=	132
Neut., Sec., St Lt									
3/0	1	x	2.094	x	1	x	29.4	=	62
CATV - PROPOSED									
Trunk	1	x	4.171	x	1	x	23.6	=	98
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	1	x	22.6	=	216
							TOTAL MOMENT DUE TO CONDUCTOR	=	797
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		29.9	=	6931
							TOTAL MOMENT DUE TO EQUIPMENT	=	6931 ft.-lb.
							TOTAL ALL MOMENTS	=	**7728 ft.-lb.**

Maximum Allowable moment on 45'/2 pole =	72108
Transformer Moment	6931
Available for conductors	65177
Conductor Moments per foot of span =	797
Maximum span distance =	**82 ft.**

CONDUCTORS	Number of Conductors	x	Wind Load Per Ft. (Table 4.2.2-7)	x	Avg. Span Length	x	Height Above Ground	=	MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	1	x	39.50	=	151
568.3	1	x	3.816	x	1	x	37.08	=	141
568.3	1	x	3.816	x	1	x	35.08	=	134
Neut., Sec., St Lt									
3/0	1	x	2.094	x	1	x	29.92	=	63
CATV - PROPOSED									
Trunk	1	x	4.171	x	1	x	24.08	=	100
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	1	x	23.08	=	221
							TOTAL MOMENT DUE TO CONDUCTOR	=	810
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		30.42	=	7051
							TOTAL MOMENT DUE TO EQUIPMENT	=	7051 ft.-lb.
							TOTAL ALL MOMENTS	=	**7861 ft.-lb.**

Maximum Allowable moment on 50/III-H pole =	95831
Transformer Moment	7051
Available for conductors	88780
Conductor Moments per foot of span =	810
Maximum span distance =	**110 ft.**

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ADDENDUM FOR EXTREME WIND LOADING

CONDUCTORS	Number of Conductors	x	Wind Load Per Ft. (Table 4.2.2-7)	x	Avg. Span Length	x	Height Above Ground	=	MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	1	x	40.00	=	153
568.3	1	x	3.816	x	1	x	37.58	=	143
568.3	1	x	3.816	x	1	x	35.58	=	136
Neut., Sec., St Lt									
3/0	1	x	2.094	x	1	x	30.42	=	64
CATV - PROPOSED									
Trunk	1	x	4.171	x	1	x	24.58	=	103
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	1	x	23.58	=	226
					TOTAL MOMENT DUE TO CONDUCTOR			=	824
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		30.92	=	7167
					TOTAL MOMENT DUE TO EQUIPMENT			=	7167 ft.-lb.
					TOTAL ALL MOMENTS			=	**7991 ft.-lb.**

Maximum Allowable moment on 50'/4.7 KIP po	134559
Transformer Moment	7167
Available for conductors	127392
Conductor Moments per foot of span =	824
Maximum span distance =	**155 ft.**

Maximum span distances for Modified Vertical Framing with various pole sizes and types, conductor sizes, CATV and Telephone Cables are listed in Table 4.2.2-8 (105 mph), Table 4.2.2-9 (130 mph), and Table 4.2.2-10 (145 mph). The span distances shown were calculated using 95% of the span distance calculated using the KEMA" Pole Design Calculation Toolkit" program. This will allow for slight variation in field conditions and rounding of values. Using the calculations described in this document may be slightly different than the table values. In some cases, the limiting factor is not the wind loading, but the required clearance above the ground and above other conductors or cables. For all joint use clearance calculations, the top joint user is considered to be attached at 23 feet above ground. When clearance is the limiting factor, the maximum span length for a specific pole is shown in bold italics. In some cases, the joint use clearance criteria cannot be met using the pole height indicated.

One other criterion incorporated in the tables is a maximum design span of 350 feet. Longer spans may be achieved, but need to be addressed on an individual basis.

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Table 4.2.2-8

Transverse Pole Loading due to Extreme Wind - 105 MPH
Maximum Span Length in Feet
Modified Vertical Construction (DCS E-5.0.0)

Conductors		Wood Pole Height and Class					
		40/3	45/3	45/2	50/2	55/2	60/1
3-568 ACAR & 3/0 AAAC-N	FPL Only	296	281	350	342	324	350
	FPL With						
	1-100 pair	*100*	211	*250*	275	259	307
	1-600 pair	*100*	165	216	200	191	223
	1-CATV	*100*	209	*250*	273	257	304
	1-100 pair & 1 CATV	*100*	176	230	213	202	255
	1-600 pair & 1 CATV	*100*	144	188	174	166	194
3-568 ACAR & 3/0 AAAC-N & 3/0 TPX	FPL Only	206	195	273	256	224	283
	FPL With	(2)					
	1-100 pair		*150*	*150*	202	191	224
	1-600 pair		137	*150*	166	158	184
	1-CATV		*150*	*150*	200	190	222
	1-100 pair & 1 CATV		144	*150*	175	166	194
	1-600 pair & 1 CATV		123	*150*	148	142	164
3-3/0 & 1/0 N	FPL Only	350	350	350	350	350	350
	FPL With						
	1-100 pair	*100*	*250*	*250*	350	350	350
	1-600 pair	*100*	223	*250*	290	276	322
	1-CATV	*100*	*250*	*250*	350	350	350
	1-100 pair & 1 CATV	*100*	*250*	*250*	350	300	350
	1-600 pair & 1 CATV	*100*	186	*250*	283	215	268
3-3/0 & 1/0 N & 3/0 TPX	FPL Only	*250*	299	350	350	344	350
	FPL With	(2)					
	1-100 pair		*150*	*150*	*250*	276	323
	1-600 pair		*150*	*150*	212	201	234
	1-CATV		*150*	*150*	*250*	275	320
	1-100 pair & 1 CATV		*150*	*150*	225	214	268
	1-600 pair & 1 CATV		143	*150*	172	164	190

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria
(2) Required clearance cannot be met with Pole length

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Table 4.2.2-8

Transverse Pole Loading due to Extreme Wind - 105 MPH
Maximum Span Length in Feet
Modified Vertical Construction (DCS E-5.0.0)

Conductors		Wood Pole Height and Class					
		40/3	45/3	45/2	50/2	55/2	60/1
3-1/0 & 1/0 N	FPL Only	350	350	350	350	350	350
	FPL With						
	1-100 pair	*100*	*250*	*250*	350	350	350
	1-600 pair	*100*	*250*	*250*	325	311	350
	1-CATV	*100*	*250*	*250*	350	350	350
	1-100 pair & 1 CATV	*100*	*250*	*250*	350	340	350
	1-600 pair & 1 CATV	*100*	205	*250*	265	237	295
3-1/0 & 1/0 N & 3/0 TPX	FPL Only	*250*	348	350	350	350	350
	FPL With	(2)					
	1-100 pair		*150*	*150*	*250*	311	350
	1-600 pair		*150*	*150*	232	220	275
	1-CATV		*150*	*150*	*250*	308	350
	1-100 pair & 1 CATV		*150*	*150*	*250*	236	295
	1-600 pair & 1 CATV		*150*	*150*	199	189	219
2-1/0 & 1/0 N	FPL Only	350	350	350	350	350	350
	FPL With						
	1-100 pair	*150*	350	350	350	350	350
	1-600 pair	*150*	290	350	350	333	350
	1-CATV	*150*	350	350	350	350	350
	1-100 pair & 1 CATV	*150*	322	350	350	350	350
	1-600 pair & 1 CATV	*150*	214	301	284	266	308
2-1/0 & 1/0 N & 3/0 TPX	FPL Only	*300*	350	350	350	350	350
	FPL With	(2)					
	1-100 pair		*200*	*200*	*300*	333	350
	1-600 pair		198	*200*	262	229	285
	1-CATV		*200*	*200*	*300*	331	350
	1-100 pair & 1 CATV		*200*	*200*	281	265	308
	1-600 pair & 1 CATV		167	*200*	204	193	224
1-1/0 & 1/0 N	FPL Only	350	350	350	350	350	350
	FPL With						
	1-100 pair	*250*	350	350	350	350	350
	1-600 pair	*250*	306	350	350	350	350
	1-CATV	*250*	350	350	350	350	350
	1-100 pair & 1 CATV	*250*	345	350	350	350	350
	1-600 pair & 1 CATV	235	218	307	291	274	317
1-1/0 & 1/0 N & 3/0 TPX	FPL Only	350	350	350	350	350	350
	FPL With						
	1-100 pair	*150*	*250*	*250*	*300*	350	350
	1-600 pair	*150*	202	*250*	268	234	294
	1-CATV	*150*	*250*	*250*	*300*	350	350
	1-100 pair & 1 CATV	*150*	220	*250*	290	273	317
	1-600 pair & 1 CATV	*150*	168	219	207	194	226

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria
(2) Required clearance cannot be met with Pole length

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Table 4.2.2-8

Transverse Pole Loading due to Extreme Wind - 105 MPH
Maximum Span Length in Feet
Modified Vertical Construction (DCS E-5.0.0)

Conductors	Attachments	SQUARE CONCRETE POLE HEIGHT AND CLASS				
		45IIIG	45IIIH	50IIIH	55IIIH	60IIIH
3-568 & 3/0 N	FPL Only	274	350	350	350	350
	FPL With 1-100 pair	208	*100*	*250*	350	350
	1-600 pair	165	*100*	*250*	305	289
	1-CATV	206	*100*	*250*	350	350
	1-100 pair & 1 CATV	176	*100*	*250*	325	307
	1-600 pair & 1 CATV	144	*100*	*250*	266	235
3-568 & 3/0 N & 3/0 TPX	FPL Only	192	*250*	*300*	350	339
	FPL With (2)	(2)				
	1-100 pair			*150*	*250*	289
	1-600 pair			*150*	237	223
	1-CATV			*150*	*250*	287
	1-100 pair & 1 CATV			*150*	*250*	235
	1-600 pair & 1 CATV			*150*	211	200
3-3/0 & 1/0 N	FPL Only	350	350	350	350	350
	FPL With 1-100 pair	*200*	*100*	*300*	*350*	*350*
	1-600 pair	*200*	*100*	*300*	*350*	*350*
	1-CATV	*200*	*100*	*300*	*350*	*350*
	1-100 pair & 1 CATV	*200*	*100*	*300*	*350*	*350*
	1-600 pair & 1 CATV	187	*100*	*300*	*350*	325
3-3/0 & 1/0 N & 3/0 TPX	FPL Only	297	*250*	350	350	350
	FPL With (2)		(2)			
	1-100 pair	*100*		*150*	*250*	350
	1-600 pair	*100*		*150*	*250*	305
	1-CATV	*100*		*150*	*250*	350
	1-100 pair & 1 CATV	*100*		*150*	*250*	325
	1-600 pair & 1 CATV	*100*		*150*	*250*	266
3-1/0 & 1/0 N	FPL Only	350	350	350	350	350
	FPL With 1-100 pair	*200*	*100*	*300*	350	350
	1-600 pair	*200*	*100*	*300*	350	350
	1-CATV	*200*	*100*	*300*	350	350
	1-100 pair & 1 CATV	*200*	*100*	*300*	350	350
	1-600 pair & 1 CATV	*200*	*100*	*300*	350	350
3-1/0 & 1/0 N & 3/0 TPX	FPL Only	350	*250*	350	350	350
	FPL With 1-100 pair	*100*	(2)	*150*	*250*	350
	1-600 pair	*100*		*150*	*250*	350
	1-CATV	*100*		*150*	*250*	350
	1-100 pair & 1 CATV	*100*		*150*	*250*	350
	1-600 pair & 1 CATV	*100*		*150*	*250*	297

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria
(2) Required clearance cannot be met with Pole length

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Table 4.2.2-8

Transverse Pole Loading due to Extreme Wind - 105 MPH
Maximum Span Length in Feet
Modified Vertical Construction (DCS E-5.0.0)

Conductors	Attachments	SPUN CONCRETE POLE HEIGHT AND CLASS			
		50' 4.7kip	55' 4.7kip	60' 5kip	65' 5kip
3-568 & 3/0 N	FPL Only	350	350	350	350
	FPL With 1-100 pair	*250*	350	350	350
	1-600 pair	*250*	350	350	350
	1-CATV	*250*	350	350	350
	1-100 pair & 1 CATV	*250*	350	350	350
	1-600 pair & 1 CATV	*250*	333	339	321
3-568 & 3/0 N & 3/0 TPX	FPL Only	350	350	350	350
	FPL With 1-100 pair	*150*	*250*	*300*	350
	1-600 pair	*150*	*250*	*300*	305
	1-CATV	*150*	*250*	*300*	350
	1-100 pair & 1 CATV	*150*	*250*	*300*	321
	1-600 pair & 1 CATV	*150*	*250*	288	272
3-3/0 & 1/0 N	FPL Only	350	350	350	350
	FPL With 1-100 pair	*300*	350	350	350
	1-600 pair	*300*	350	350	350
	1-CATV	*300*	350	350	350
	1-100 pair & 1 CATV	*300*	350	350	350
	1-600 pair & 1 CATV	*300*	429	438	411
3-3/0 & 1/0 N & 3/0 TPX	FPL Only	350	350	350	350
	FPL With 1-100 pair	*150*	*250*	*350*	350
	1-600 pair	*150*	*250*	*350*	350
	1-CATV	*150*	*250*	*350*	350
	1-100 pair & 1 CATV	*150*	*250*	*350*	350
	1-600 pair & 1 CATV	*150*	*250*	*350*	334
3-350 CU & 2/0 CU N	FPL Only	350	350	350	350
	FPL With 1-100 pair	*250*	350	350	350
	1-600 pair	*250*	350	350	350
	1-CATV	*250*	350	350	350
	1-100 pair & 1 CATV	*250*	350	350	350
	1-600 pair & 1 CATV	*250*	350	350	350
3-350 CU & 2/0 CU N & 3/0 TPX	FPL Only	350	350	350	350
	FPL With 1-100 pair	*200*	*250*	*350*	350
	1-600 pair	*200*	*250*	*350*	343
	1-CATV	*200*	*250*	*350*	350
	1-100 pair & 1 CATV	*200*	*250*	*350*	350
	1-600 pair & 1 CATV	*200*	*250*	323	302

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria
(2) Required clearance cannot be met with Pole length

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Table 4.2.2-9

Transverse Pole Loading due to Extreme Wind - 130 MPH
Maximum Span Length in Feet
Modified Vertical Construction (DCS E-5.0.0)

Conductors	Attachments	WOOD POLE HEIGHT AND CLASS					
		40/3	45/3	45/2	50/2	55/2	60/1
3-568 & 3/0 N	FPL Only	162	151	201	183	170	200
	FPL With						
	1-100 pair	*100*	122	162	147	137	160
	1-600 pair	*100*	95	127	115	107	125
	1-CATV	*100*	121	161	146	136	159
	1-100 pair & 1 CATV	*100*	102	135	123	114	133
	1-600 pair & 1 CATV	91	83	111	100	94	108
3-568 & 3/0 N & 3/0 TPX	FPL Only	122	112	149	137	126	148
	FPL With	(2)					
	1-100 pair		95	127	116	107	125
	1-600 pair		79	105	96	89	104
	1-CATV		95	126	116	107	124
	1-100 pair & 1 CATV		83	110	101	93	108
	1-600 pair & 1 CATV		70	94	86	80	92
3-3/0 & 1/0 N	FPL Only	295	274	364	333	308	350
	FPL With						
	1-100 pair	*100*	181	*250*	219	203	237
	1-600 pair	*100*	128	171	155	145	167
	1-CATV	*100*	179	*250*	216	201	234
	1-100 pair & 1 CATV	*100*	140	186	168	158	182
	1-600 pair & 1 CATV	*100*	107	143	128	121	139
3-3/0 & 1/0 N & 3/0 TPX	FPL Only	175	161	214	198	181	211
	FPL With	(2)					
	1-100 pair		128	171	157	145	168
	1-600 pair		101	134	122	113	131
	1-CATV		127	169	156	143	166
	1-100 pair & 1 CATV		106	143	130	121	139
	1-600 pair & 1 CATV		87	117	105	99	113
3-1/0 & 1/0 N	FPL Only	350	350	350	350	350	350
	FPL With						
	1-100 pair	*100*	214	*250*	278	258	301
	1-600 pair	*100*	144	193	174	163	188
	1-CATV	*100*	211	*250*	275	256	297
	1-100 pair & 1 CATV	*100*	159	212	191	180	207
	1-600 pair & 1 CATV	*100*	118	158	142	133	153

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria

(2) Required clearance cannot be met with Pole length

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Table 4.2.2-9

Transverse Pole Loading due to Extreme Wind - 130 MPH
Maximum Span Length in Feet

Modified Vertical Construction (DCS E-5.0.0)

Conductors	Attachments	WOOD POLE HEIGHT AND CLASS					
		40/3	**45/3**	**45/2**	**50/2**	**55/2**	**60/1**
3-1/0 & 1/0 N & 3/0 TPX	FPL Only	203	186	267	230	211	264
	FPL With	(2)					
	1-100 pair		144	*150*	177	163	189
	1-600 pair		110	146	134	124	143
	1-CATV		143	*150*	175	162	187
	1-100 pair & 1 CATV		118	*150*	143	133	153
	1-600 pair & 1 CATV		94	126	114	106	123
2-1/0 & 1/0 N	FPL Only	350	350	350	350	350	350
	FPL With						
	1-100 pair	*200*	265	*350*	325	298	348
	1-600 pair	170	155	206	192	175	202
	1-CATV	*200*	261	347	318	294	340
	1-100 pair & 1 CATV	189	172	230	213	195	225
	1-600 pair & 1 CATV	136	123	163	153	139	161
2-1/0 & 1/0 N & 3/0 TPX	FPL Only	226	208	298	276	236	296
	FPL With	(2)					
	1-100 pair		155	*200*	191	175	203
	1-600 pair		114	151	142	129	149
	1-CATV		153	204	189	173	201
	1-100 pair & 1 CATV		123	163	151	139	161
	1-600 pair & 1 CATV		96	128	118	109	125
1-1/0 & 1/0 N	FPL Only	350	350	350	350	350	350
	FPL With						
	1-100 pair	*250*	308	*350*	*350*	349	*350*
	1-600 pair	179	163	218	202	186	216
	1-CATV	*250*	348	*350*	*350*	*350*	*350*
	1-100 pair & 1 CATV	222	203	292	271	232	288
	1-600 pair & 1 CATV	147	134	179	166	153	177
1-1/0 & 1/0 N & 3/0 TPX	FPL Only	274	257	341	309	285	333
	FPL With						
	1-100 pair	*150*	166	221	202	187	217
	1-600 pair	126	117	156	143	132	153
	1-CATV	*150*	178	*250*	217	200	233
	1-100 pair & 1 CATV	146	135	181	166	152	177
	1-600 pair & 1 CATV	110	102	135	125	115	133

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria
(2) Required clearance cannot be met with Pole length

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Table 4.2.2-9

Transverse Pole Loading due to Extreme Wind - 130 MPH
Maximum Span Length in Feet
Modified Vertical Construction (DCS E-5.0.0)

Conductors	Attachments	SQUARE CONCRETE POLE HEIGHT AND CLASS				
		45IIIG	45IIIH	50IIIH	55IIIH	60IIIH
3-568 & 3/0 N	FPL Only	143	308	290	268	227
	FPL With					
	1-100 pair	115	*100*	216	200	182
	1-600 pair	90	*100*	170	156	143
	1-CATV	114	*100*	215	198	181
	1-100 pair & 1 CATV	96	*100*	181	166	153
	1-600 pair & 1 CATV	79	*100*	148	136	125
3-568 & 3/0 N & 3/0 TPX	FPL Only	105	213	200	186	169
	FPL With	(2)	(2)			
	1-100 pair			*150*	158	143
	1-600 pair			141	130	119
	1-CATV			*150*	157	143
	1-100 pair & 1 CATV			147	137	124
	1-600 pair & 1 CATV			125	116	106
3-3/0 & 1/0 N	FPL Only	259	350	350	350	350
	FPL With					
	1-100 pair	171	*100*	*300*	318	291
	1-600 pair	123	*100*	228	210	194
	1-CATV	169	*100*	*300*	314	287
	1-100 pair & 1 CATV	133	*100*	267	228	210
	1-600 pair & 1 CATV	103	*100*	190	174	162
3-3/0 & 1/0 N & 3/0 TPX	FPL Only	152	*150*	308	286	259
	FPL With	(2)	(2)			
	1-100 pair			*150*	213	194
	1-600 pair			*150*	165	151
	1-CATV			*150*	211	192
	1-100 pair & 1 CATV			*150*	176	161
	1-600 pair & 1 CATV			*150*	143	131
3-1/0 & 1/0 N	FPL Only	332	350	350	350	350
	FPL With					
	1-100 pair	*200*	*100*	*300*	350	345
	1-600 pair	138	*100*	277	236	218
	1-CATV	200	*100*	*300*	350	340
	1-100 pair & 1 CATV	151	*100*	*300*	280	257
	1-600 pair & 1 CATV	113	*100*	210	192	178
3-1/0 & 1/0 N & 3/0 TPX	FPL Only	177	*250*	350	334	302
	FPL With	(2)	(2)			
	1-100 pair			*150*	*250*	218
	1-600 pair			*150*	181	166
	1-CATV			*150*	237	216
	1-100 pair & 1 CATV			*150*	194	178
	1-600 pair & 1 CATV			*150*	155	143

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria
(2) Required clearance cannot be met with Pole length

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Table 4.2.2-9

Transverse Pole Loading due to Extreme Wind - 130 MPH
Maximum Span Length in Feet
Modified Vertical Construction (DCS E-5.0.0)

Conductors	Attachments	SPUN CONCRETE POLE HEIGHT AND CLASS			
		50' 4.7kip	55' 4.7kip	60' 5kip	65' 5kip
3-568 & 3/0 N	FPL Only	350	350	350	337
	FPL With				
	1-100 pair	*250*	294	289	270
	1-600 pair	223	214	213	197
	1-CATV	*250*	292	287	268
	1-100 pair & 1 CATV	*250*	227	225	209
	1-600 pair & 1 CATV	195	185	185	170
3-568 & 3/0 N & 3/0 TPX	FPL Only	284	274	269	232
	FPL With				
	1-100 pair	*150*	216	213	197
	1-600 pair	*150*	178	176	162
	1-CATV	*150*	215	211	196
	1-100 pair & 1 CATV	*150*	187	184	170
	1-600 pair & 1 CATV	*150*	159	158	144
3-3/0 & 1/0 N	FPL Only	350	350	350	350
	FPL With				
	1-100 pair	*300*	350	350	350
	1-600 pair	*300*	310	307	282
	1-CATV	*300*	350	350	350
	1-100 pair & 1 CATV	*300*	336	333	307
	1-600 pair & 1 CATV	270	257	256	219
3-3/0 & 1/0 N & 3/0 TPX	FPL Only	350	350	350	350
	FPL With				
	1-100 pair	*150*	*250*	307	283
	1-600 pair	*150*	226	224	205
	1-CATV	*150*	*250*	305	280
	1-100 pair & 1 CATV	*150*	*250*	256	219
	1-600 pair & 1 CATV	*150*	196	195	178
3-350 CU & 2/0 CU N	FPL Only	350	350	350	350
	FPL With				
	1-100 pair	*250*	350	350	328
	1-600 pair	*250*	267	266	228
	1-CATV	*250*	350	350	325
	1-100 pair & 1 CATV	*250*	287	284	263
	1-600 pair & 1 CATV	221	211	211	194
3-350 CU & 2/0 CU N & 3/0 TPX	FPL Only	339	328	321	298
	FPL With				
	1-100 pair	*200*	*250*	266	228
	1-600 pair	*200*	201	200	183
	1-CATV	*200*	*250*	262	226
	1-100 pair & 1 CATV	*200*	213	210	194
	1-600 pair & 1 CATV	184	177	176	161

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria
(2) Required clearance cannot be met with Pole length

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Table 4.2.2-10

Transverse Pole Loading due to Extreme Wind - 145 MPH
Maximum Span Length in Feet

Modified Vertical Construction (DCS E-5.0.0)

Conductors		Wood Pole Height and Class					
		40/3	45/3	45/2	50/2	55/2	60/1
3-568 ACAR & 3/0 AAAC-N	**FPL Only**	121	110	150	134	122	143
	FPL With						
	1-100 pair	98	88	121	107	98	114
	1-600 pair	78	69	94	84	77	88
	1-CATV	97	87	120	106	97	113
	1-100 pair & 1 CATV	83	74	101	89	82	94
	1-600 pair & 1 CATV	68	61	83	73	67	77
3-568 ACAR & 3/0 AAAC-N & 3/0 TPX	**FPL Only**	90	82	111	100	90	105
	FPL With	(2)					
	1-100 pair		69	94	85	77	89
	1-600 pair		57	78	69	64	73
	1-CATV		69	94	85	76	88
	1-100 pair & 1 CATV		61	82	73	67	77
	1-600 pair & 1 CATV		51	70	62	57	66
3-3/0 & 1/0 N	**FPL Only**	203	186	272	226	205	257
	FPL With						
	1-100 pair	146	131	179	160	145	168
	1-600 pair	105	93	127	113	104	119
	1-CATV	144	130	177	158	143	166
	1-100 pair & 1 CATV	114	102	138	123	113	129
	1-600 pair & 1 CATV	88	78	106	94	86	99
3-3/0 & 1/0 N & 3/0 TPX	**FPL Only**	130	117	159	143	130	150
	FPL With	(2)					
	1-100 pair		93	127	114	104	120
	1-600 pair		73	100	88	81	93
	1-CATV		93	126	113	103	119
	1-100 pair & 1 CATV		78	105	95	86	99
	1-600 pair & 1 CATV		64	86	77	70	81

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria

(2) Required clearance cannot be met with Pole length

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Table 4.2.2-10

Transverse Pole Loading due to Extreme Wind - 145 MPH
Maximum Span Length in Feet
Modified Vertical Construction (DCS E-5.0.0)

Conductors		Wood Pole Height and Class					
		40/3	45/3	45/2	50/2	55/2	60/1
3-1/0 & 1/0 N	**FPL Only**	282	256	348	311	282	330
	FPL With						
	1-100 pair	*100*	156	212	188	173	200
	1-600 pair	*100*	105	143	126	117	134
	1-CATV	*100*	154	209	186	170	197
	1-100 pair & 1 CATV	*100*	116	157	140	128	146
	1-600 pair & 1 CATV	98	86	117	104	95	108
3-1/0 & 1/0 N & 3/0 TPX	**FPL Only**	151	136	184	167	151	174
	FPL With	(2)					
	1-100 pair		105	143	128	117	134
	1-600 pair		80	108	97	89	102
	1-CATV		105	142	127	116	133
	1-100 pair & 1 CATV		86	117	105	95	108
	1-600 pair & 1 CATV		68	93	84	76	86
2-1/0 & 1/0 N	**FPL Only**	350	334	350	350	350	350
	FPL With						
	1-100 pair	200	180	262	220	199	230
	1-600 pair	126	113	153	140	125	143
	1-CATV	196	177	258	217	195	226
	1-100 pair & 1 CATV	141	125	170	155	140	161
	1-600 pair & 1 CATV	101	89	122	111	100	114
2-1/0 & 1/0 N & 3/0 TPX	**FPL Only**	168	152	206	187	169	196
	FPL With	(2)					
	1-100 pair		113	153	140	125	144
	1-600 pair		83	112	103	92	105
	1-CATV		111	151	138	124	143
	1-100 pair & 1 CATV		89	122	110	100	114
	1-600 pair & 1 CATV		70	95	86	78	89
1-1/0 & 1/0 N	**FPL Only**	350	350	350	350	350	350
	FPL With						
	1-100 pair	231	208	305	276	232	288
	1-600 pair	133	119	162	147	133	154
	1-CATV	226	203	297	270	227	282
	1-100 pair & 1 CATV	150	135	182	167	151	174
	1-600 pair & 1 CATV	103	91	124	114	103	118
1-1/0 & 1/0 N & 3/0 TPX	**FPL Only**	188	174	237	210	191	221
	FPL With						
	1-100 pair	133	122	164	147	134	154
	1-600 pair	94	86	116	105	94	108
	1-CATV	131	120	162	146	132	152
	1-100 pair & 1 CATV	103	92	125	114	103	118
	1-600 pair & 1 CATV	78	70	96	87	78	90

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria
(2) Required clearance cannot be met with Pole length

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Table 4.2.2-10

Transverse Pole Loading due to Extreme Wind - 145 MPH
Maximum Span Length in Feet

Modified Vertical Construction (DCS E-5.0.0)

Conductors	Attachments	SQUARE CONCRETE POLE HEIGHT AND CLASS				
		45IIIG	45IIIH	50IIIH	55IIIH	60IIIH
3-568 & 3/0 N	FPL Only	99	209	193	174	154
	FPL With					
	1-100 pair	80	*100*	155	139	124
	1-600 pair	63	*100*	122	109	97
	1-CATV	79	*100*	154	138	123
	1-100 pair & 1 CATV	67	*100*	129	116	104
	1-600 pair & 1 CATV	55	*100*	105	95	85
3-568 & 3/0 N & 3/0 TPX	FPL Only	73	157	143	130	114
	FPL With	(2)	(2)			
	1-100 pair			122	110	97
	1-600 pair			101	90	81
	1-CATV			121	109	97
	1-100 pair & 1 CATV			105	95	85
	1-600 pair & 1 CATV			90	81	72
3-3/0 & 1/0 N	FPL Only	167	350	349	314	278
	FPL With					
	1-100 pair	119	*100*	230	206	184
	1-600 pair	85	*100*	163	146	131
	1-CATV	118	*100*	227	204	181
	1-100 pair & 1 CATV	92	*100*	178	159	143
	1-600 pair & 1 CATV	71	*100*	136	122	109
3-3/0 & 1/0 N & 3/0 TPX	FPL Only	105	225	204	186	164
	FPL With	(2)	(2)			
	1-100 pair			*150*	148	131
	1-600 pair			127	115	103
	1-CATV			*150*	147	130
	1-100 pair & 1 CATV			136	123	109
	1-600 pair & 1 CATV			111	100	89
3-1/0 & 1/0 N	FPL Only	214	350	350	350	350
	FPL With					
	1-100 pair	142	*100*	294	264	219
	1-600 pair	96	*100*	184	164	147
	1-CATV	140	*100*	290	260	215
	1-100 pair & 1 CATV	105	*100*	202	181	162
	1-600 pair & 1 CATV	79	*100*	150	134	121
3-1/0 & 1/0 N & 3/0 TPX	FPL Only	123	*250*	257	218	191
	FPL With		(2)			
	1-100 pair	96		*150*	167	147
	1-600 pair	73		140	126	112
	1-CATV	95		150	165	146
	1-100 pair & 1 CATV	78		150	135	121
	1-600 pair & 1 CATV	63		121	108	96

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria

(2) Required clearance cannot be met with Pole length

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Table 4.2.2-10

Transverse Pole Loading due to Extreme Wind - 145 MPH
Maximum Span Length in Feet
Modified Vertical Construction (DCS E-5.0.0)

Conductors	Attachments	SPUN CONCRETE POLE HEIGHT AND CLASS			
		50' 4.7kip	55' 4.7kip	60' 5kip	65' 5kip
3-568 & 3/0 N	FPL Only	291	276	267	227
	FPL With				
	1-100 pair	217	205	200	181
	1-600 pair	170	161	157	143
	1-CATV	215	203	198	181
	1-100 pair & 1 CATV	181	171	166	151
	1-600 pair & 1 CATV	148	140	137	124
3-568 & 3/0 N & 3/0 TPX	FPL Only	200	192	184	168
	FPL With				
	1-100 pair	*150*	162	157	143
	1-600 pair	141	134	130	118
	1-CATV	*150*	162	156	142
	1-100 pair & 1 CATV	147	141	137	124
	1-600 pair & 1 CATV	125	120	116	105
3-3/0 & 1/0 N	FPL Only	350	350	350	350
	FPL With				
	1-100 pair	*300*	328	317	288
	1-600 pair	229	217	212	191
	1-CATV	*300*	324	314	285
	1-100 pair & 1 CATV	267	235	230	207
	1-600 pair & 1 CATV	191	180	177	158
3-3/0 & 1/0 N & 3/0 TPX	FPL Only	309	296	283	257
	FPL With				
	1-100 pair	*150*	219	212	191
	1-600 pair	*150*	170	165	148
	1-CATV	*150*	218	210	189
	1-100 pair & 1 CATV	*150*	181	176	158
	1-600 pair & 1 CATV	*150*	147	143	128
3-350 CU & 2/0 CU N	FPL Only	350	350	341	313
	FPL With				
	1-100 pair	*250*	269	259	220
	1-600 pair	198	187	182	165
	1-CATV	*250*	266	257	219
	1-100 pair & 1 CATV	212	200	196	177
	1-600 pair & 1 CATV	168	159	156	140
3-350 CU & 2/0 CU N & 3/0 TPX	FPL Only	257	230	220	200
	FPL With				
	1-100 pair	198	189	182	165
	1-600 pair	159	151	147	132
	1-CATV	196	187	181	164
	1-100 pair & 1 CATV	168	161	156	140
	1-600 pair & 1 CATV	141	133	130	116

(1) Span Lengths Shown in *Italic* are Limited by Clearance Criteria
(2) Required clearance cannot be met with Pole length

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C. *Storm Guying*

One method to overcome the overload on a pole due to transverse wind load is to add storm guys. Storm guys are installed in pairs(back to back) – one on each side of the pole perpendicular to the pole line. These guys should typically be installed 6 inches to 2 feet below the primary attachments.

Calculating the size of the guy wire is very much like calculating a deadend guy.

1. Calculate the transverse wind load on the pole, conductors and all attachments and equipment.
2. The load is then used to size the guy wire based on the load, the attachment height and lead length.
3. A final check should be made to verify that the strength of the pole above the guy attachment is adequate.

Using the example of Case I above for the 45'/2 pole, calculate the size of the storm guys and anchors required for extreme wind loading.

1. Transverse wind loads:

Pole	=	Wind load on pole
Primary conductors	=	Wind Load per ft x span length x number of
Neutral	=	Wind Load per ft x span length
CATV	=	Wind Load per ft x span length
Telephone	=	Wind Load per ft x span length
Transformer	=	Wind Load

Load on Pole	=						=	1713 pounds
Primary	=	3.816	x	170	x	3	=	1946 pounds
Neutral	=	2.094	x	170	x	1	=	356 pounds
CATV	=	4.171	x	170	x	1	=	709 pounds
Telephone	=	9.573	x	170	x	1	=	1627 pounds
Transformer	=	231.8	x	1			=	232 pounds
				Total Load			=	6583 pounds

2. Determine the guy wire size and anchor size required for this installation.

   To calculate the tension in the guy wire use the equation below

Equation 4.2.2-7 $$T_{DG} = \frac{T_{TWL}}{L} x \sqrt{H_G^2 + L^2}$$

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Where:

T_{DG} = *Tension in down guy*
T_{TWL} = *Transverse Wind Load*
L = *The down guy Lead length*
H_G = *The attachment Height of the down guy*

Use the total transverse wind load for the load to be guyed with the guy attached 6 inches below C phase primary (34.1') and a lead length of 20 feet.

$$T_{DG} = \frac{6583}{20}\sqrt{(34.1)^2 + (20)^2}$$

T_{DG} = 13,013 Pounds

For extreme wind loading, the required strength of the guy wire is equal to the rated breaking strength of the guy wire x 0.9.

Table 4.2.2-11 Storm Guy Strength

Guy Size	Rated Breaking Strength (RBS)	Allowable Guy Tension .9 X RBS
5/16	11200	10080
7/16	20800	18720
9/16	33700	30330

For this example, a 7/16" guy will be installed in each direction perpendicular to the pole line. Use the tension in the down guy to select the appropriate anchor from DCS D-4.0.2. In this case, a 10" screw anchor will do the job.

3. One final check is to be sure that the pole length above the storm guy attachment has sufficient strength to support the load above it. Basically, this is just like calculating the strength of the total pole but now the "ground line" is at the storm guy attachment height and all of the facilities above this point will create a moment here.

   With the top of the pole at 38' and the down guy at 34.1 feet, the length of pole exposed to the wind is now 38-34.1 = 3.9 ft.

   Use equation 4.2.2-3 to determine the strength of this section of pole.

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From Table G (DERM 4.2.2) circumference at 3.9 feet down from the top of the pole = 26.5 inches

$M_r = 0.000264 \times (8{,}000) \times (26.5)^3 \times 0.75 = 29{,}478$ ft.-lbs.

Use equation 4.2.2-4 to find the area of this section of pole

$$A = 3.9\left(\frac{25+26.5}{2}\right)\left(\frac{1}{12}''\right) = 2.66 sqft$$

Use equation 4.2.2-5 to find the center of the area of this section of pole

$$Height\ of\ center\ of\ area, H_{CA} = \frac{3.9(8.44+2(7.96))}{3(8.44+7.96)} = 1.93 ft$$

Use equation 4.2.2-2 to find the wind load on this section of pole

Load in pounds = 0.00256 x (145)² x1.0 x0.97 x 1 x 1x 2.66= 139 pounds

Use equation 4.2.2-6 to determine the moment due to the wind load on this section of the pole at the guy attachment point

Moment = 1.93 x 139 = 269 ft lbs

Determine the moment created by the wind load on the conductors

Primary	=	3.816	x	170	x	1	x	4.9	=	3179 Ft-Lbs
	=	3.816	x	170	x	1	x	2.5	=	1622 Ft-Lbs
	=	3.816	x	170	x	1	x	0.5	=	324 Ft-Lbs
										5125 Ft-Lbs
Total Moment	=	269	+	5125	=	5393 Ft-Lbs				

This load is well under the strength calculated above and the design using storm guys will meet requirements.

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4.2.3 Pole Framing

A. Slack Span Construction

Slack span construction is employed where it is impractical to follow conventional guying practices. The proper application is a pull-off from either a tangent pole or a properly guyed deadend pole to another properly guyed deadend pole. The intent is not to slack span to a stand alone (self-support) pole unless that pole has been properly sized for this application. Improper use of slack span construction can cause a pole to bow or lean which then can cause more slack in the conductors. More slack in the conductors can result in improper clearances and increased potential for conductors to make contact with each other.

DERM 4.4.5 page 1 shows the initial sag to be used when installing slack spans. The amount of sag shown, limits the per conductor tension to 50 pounds.

Slack Span design criteria:

1. Vertical construction is preferred for two and three phase installations (DCS E-5.7.1).
   Maintain 36" separation between phases at the poles.
2. Limit the span lengths to

Table 4.2.2-12 Slack Span Length & Sag

SLACK SPAN		
CONDUCTOR	MAXIMUM LENGTH	INITIAL SAG
568.3 ACAR	50'	3'-7"
3/0 AAAC	75'	2'-9"
1/0 AAAC	95'	2'-10"

3. Use class 2 poles minimum.
4. If crossarm construction is used, use the 9 foot heavy duty wood crossarms or the 8'6" steel crossarm for added horizontal spacing (DCS E-29.0.0 and E-29.1.0).

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B. ***Targeted Poles***

There are many poles in the distribution system identified as Targeted Poles. These poles are deemed critical by virtue of the equipment mounted on them or their importance to maintaining the system. As stated in The Distribution Design Guide "The following list comprises what will be considered targeted poles. When installing and/or replacing an accessible targeted pole, use a III-H concrete pole or a spun concrete pole for spans greater than 300 feet. If the pole is inaccessible, use a Class 2 pole, or consider relocating the equipment to an accessible concrete pole."

Targeted Pole List

"01" Feeder Switch Poles (first pole outside the substation)
Automated Feeder Switches
Interstate/Highway Crossings
Capacitor Banks
Multiple Primary Risers
3 Phase Reclosers
Aerial Auto Transformers
Multiple Circuits
3 phase Transformer Banks (3-100 kVA and larger)
Regulators
Primary Meter

The targeted pole also should meet the design criteria for wind loading as previously shown.

C. ***Distribution Design Guidelines***

The Storm Secure Organization has developed a set of guidelines for Distribution Designers to use when designing or maintaining distribution facilities. The designer can go online to see the most current version.

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Power Systems

Distribution Construction Standards

ADDENDUM TO

DECEMBER 2005 EDITION

(FOR 2007 HARDENING APPLICATIONS)

This book contains the current standards of distribution construction that have been updated to accommodate 'Hardened' installations for Florida Power & Light Company. These standards are updated periodically by the staff of the Distribution Product Engineering and Reliabilty Engineering departments. Changed or updated standards are denoted with an asterisk (*) in the table of contents. Non-standard field situations may arise that are not covered by this book. In those instances, please contact the Distribution Product Engineering department at 561 845-4831for assistance. Current information on individual Product Engineers Responsibilities can be found in IN-FPL under Business Units Power Systems Distribution Reliability Products. This publication is also available in IN-FPL under Business Units Power Systems Reference Information Distribution Manuals Distribution Construction Standards (DCS) Drawings.

The Power Systems-Distribution Construction Standards are the sole and exclusive property of Florida Power & Light Co (FPL). These standards were developed by FPL to establish uniform standards for construction and equipment applications throughout FPL's electric system.

The Distribution Construction Standards are proprietary business documents and are not to be duplicated or disclosed to any third party without the express written consent of Florida Power & Light Co.

Distribution Product Engineer (DEO/PDC) 2456 Port West Boulevard, West Palm Beach, FL. 33407-1298

DISTRIBUTION CONSTRUCTION STANDARDS
ADDENDUM TO DECEMBER 2005 EDITION

Section-Page	Title	Description of Revision
C-7.0.0	Single Phase Recloser	1 or 2 phases on class 3 and 3 phase on Concrete Pole
C-8.0.0	Three Phase Recloser on Concrete Poles	3 Phase on concrete poles
C-9.0.4	Distribution Automation Switches	New or Replacement poles to be concrete
C-9.0.5	Distribution Automation Switches	New or Replacement poles to be concrete
C-9.1.0	Commercial/Industrial Load Control	New or Replacement poles to be concrete
C-9.1.1	Wiring Diagram for CILC	New drawing
C-9.2.0	SCADA-MATE Switch	Added notes
C-9.2.1	SCADA-MATE Switch	New page with notes
C-9.2.2	SCADA-MATE Radio Repeater	Update drawing and notes
D-2.0.0	Pole Setting, Guying & Bracing	Revised criteria for guy strain insulators
D-3.0.0	Pole Setting Depths	New setting Depths and Soil Conditions
D-7.0.0	Method of attaching guys	Added spun concrete installation
D-7.0.1	Method of attaching guys	Revised criteria for guy strain insulators
D-13.0.0	Storm Guying	New standard for storm guys
E-3.0.0	Overhead Equipment Dimensions	Add drawing for spun concrete pole
E-5.0.0	Post Insulator Construction	Add insulator bracket for spun concrete pole
E-5.0.2	Installation of Hardware	Add insulator bracket for spun concrete pole
E-5.7.1	Slack Span Construction Vertical	Add table and minimum pole size. Revised note for FGI's
E-6.0.0	Tangent Construction Wood Crossarm	Added note for use of Steel Crossarm
E-6.0.1	Tangent Construction Steel Crossarm	Change for mounting Pole top bracket opposite of steel crossarm
E-8.0.0	Angle Construction Concrete Pole	Change for mounting Pole top bracket opposite of steel crossarm
E-5.29.0.0	Slack Span Construction	Add table and minimum pole size. Revised note for FGI's
E-5.29.1.0	Slack Span Construction Concrete Pole Installation Only	Add table
G-3.0.2	Pole Grounding	Added figure for spun concrete pole
H-4.0.0	Street Light Pole Weights	New setting depths
I-3.2.0	Transformer Pole Weight Loading	Revised Table and added note for New or Replacement Poles for 3-100kVA Transformer Banks to be concrete poles
I-9.0.0	Single Phase Step Down Transformer on URD Terminator Pole	Removed wood pole class
I-10.0.0	Single Phase Line Regulator Installation (Alternate Method)	Removed wood pole class
I-51.0.0	Wye Closed Delta Bank - Modified Vertical	New or Replacement Poles for 3-100kVA and larger Transformer Banks to be concrete poles
I-52.0.0	Wye-Wye Bank Crossarm Construction	New or Replacement Poles for 3-100kVA and larger Transformer Banks to be concrete poles
I-52.0.2	Wye-Wye Bank Modified Vertical Construction	New or Replacement Poles for 3-100kVA and larger Transformer Banks to be concrete poles
J-1.0.2	Capacitor Banks General	New or Replacement poles to be concrete
J-2.0.2	Capacitor Banks Single Phase Units	New or Replacement poles to be concrete
J-2.0.3	Capacitor Banks Single Phase w/Puts	New or Replacement poles to be concrete
K-28.0.0	Outdoor Primary Metering Cluster Mounted Underground Service	Changed to Maintenance Only for underground - use URD primary to pad mounted metering cabinet. Replacement poles to be concrete.
K-28.1.0	Outdoor Primary Metering Cluster Mounted Overhead Service	New or Replacement poles to be concrete
M-2.0.0	Distribution Circuits on Transmission Poles Universal Spun Concrete Pole	Added notes to reflect that no additional holes can be added to a Universal Spun Concrete Transmission Pole
UH-15.0.0	Primary and Feeder Riser Pole	New or Replacement poles to be concrete
UH-15.3.1	Three Phase Feeder Riser	New or Replacement poles to be concrete
Z-12.0.1	Spun Concrete Pole Diameter & weight	New page with spun concrete pole information

INSTALLATION OF SINGLE PHASE POLE MOUNTED RECLOSERS

C-7.0.0

Docket No. 070301-EI
FPL Storm Hardening Plan
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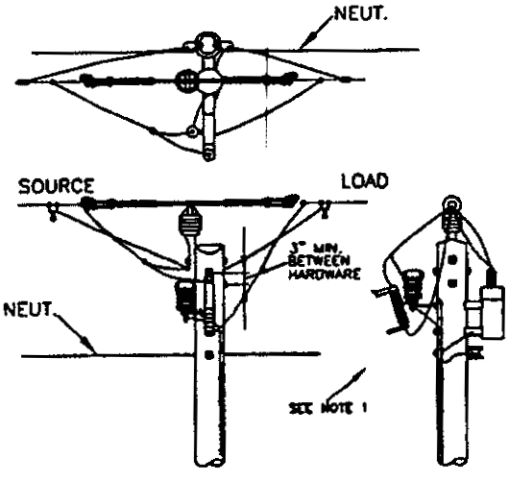
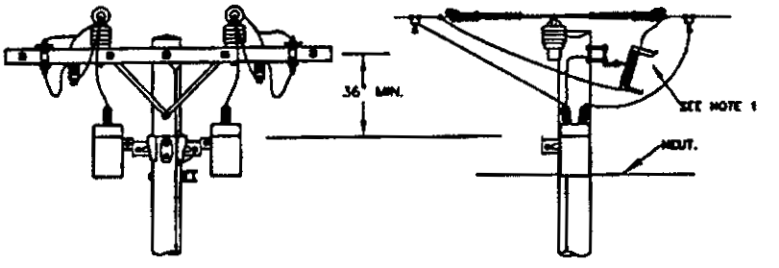
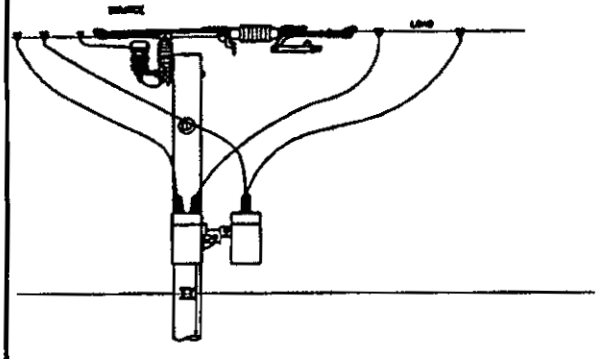
C

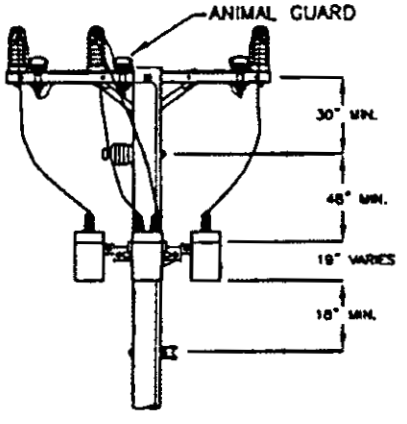


SINGLE PHASE INSTALLATION



TWO PHASE INSTALLATION





THREE PHASE INSTALLATION
(USE CONCRETE POLE)

NOTES:

1. WHERE CUTOUT IS USED AS A BY-PASS SWITCH, FUSE HOLDER SHALL BE REMOVED AND KEPT IN A CONVENIENT LOCATION ON THE POLE, FOR USE WHEN BY-PASSING RECLOSER. FASTEN FUSE HOLDER TO POLE WITH OPEN END OF BARREL DOWN.
2. LARGER RECLOSERS MUST BE PROPERLY ORIENTED WITH RESPECT TO SOURCE AND LOAD SIDES. KYLE TYPE H RECLOSERS DO NOT HAVE TO BE SO ORIENTED. BUT THEY SHOULD BE INSTALLED SO THAT THE COUNTER IS TOWARD THE POLE, MAKING IT EASIER TO READ.
3. INSTALL ARRESTERS ON SOURCE AND LOAD SIDE OF ALL RECLOSERS, TWO (2) REQUIRED PER PHASE. WHERE SPACE IS NOT AVAILABLE, INSTALL ARRESTERS ON ADJACENT POLE.
4. THREE PHASE INSTALLATIONS ARE TO BE IN ACCESSIBLE LOCATIONS ON CONCRETE POLES, CLASS III-H, 4.7 KIP SPUN, OR STRONGER WITH 8'-6" STEEL CROSSARM.
5. SINGLE PHASE OR TWO PHASE INSTALLATIONS ARE TO BE ON CLASS 3 WOOD POLES OR STRONGER.

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
	1/9/07	ADDED POLE INFORMATION, NOTES 4 & 5	CEA	ELS	JJM
3	9/22/04	ADD ANIMAL GUARD	LFV	ELS	JJM
2	10/23/01	UPDATE DRAWING (TITLE CHANGE, NOTES, AND SHOW 3 SINGLE PHASE RECLOSERS)	CEA	JES	JJM
1	10/13/99	REMOVE BARREL FROM SINGLE & DOUBLE PHASE DETAIL	CEA	PRH	JNM

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: ERB
DRAWN BY: H.V.
DATE: 11/11/64
APPROVED: J.J. MCEVOY
SUPERVISOR OH/UG PRODUCT SUPPORT SERVICES
NO SCALE

C-8.0.0

THREE PHASE RECLOSER ON CONCRETE POLES TYPES 3H, 6H, R, RX, RV, W, AND WV

C-8.0.0

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FPL Storm Hardening Plan
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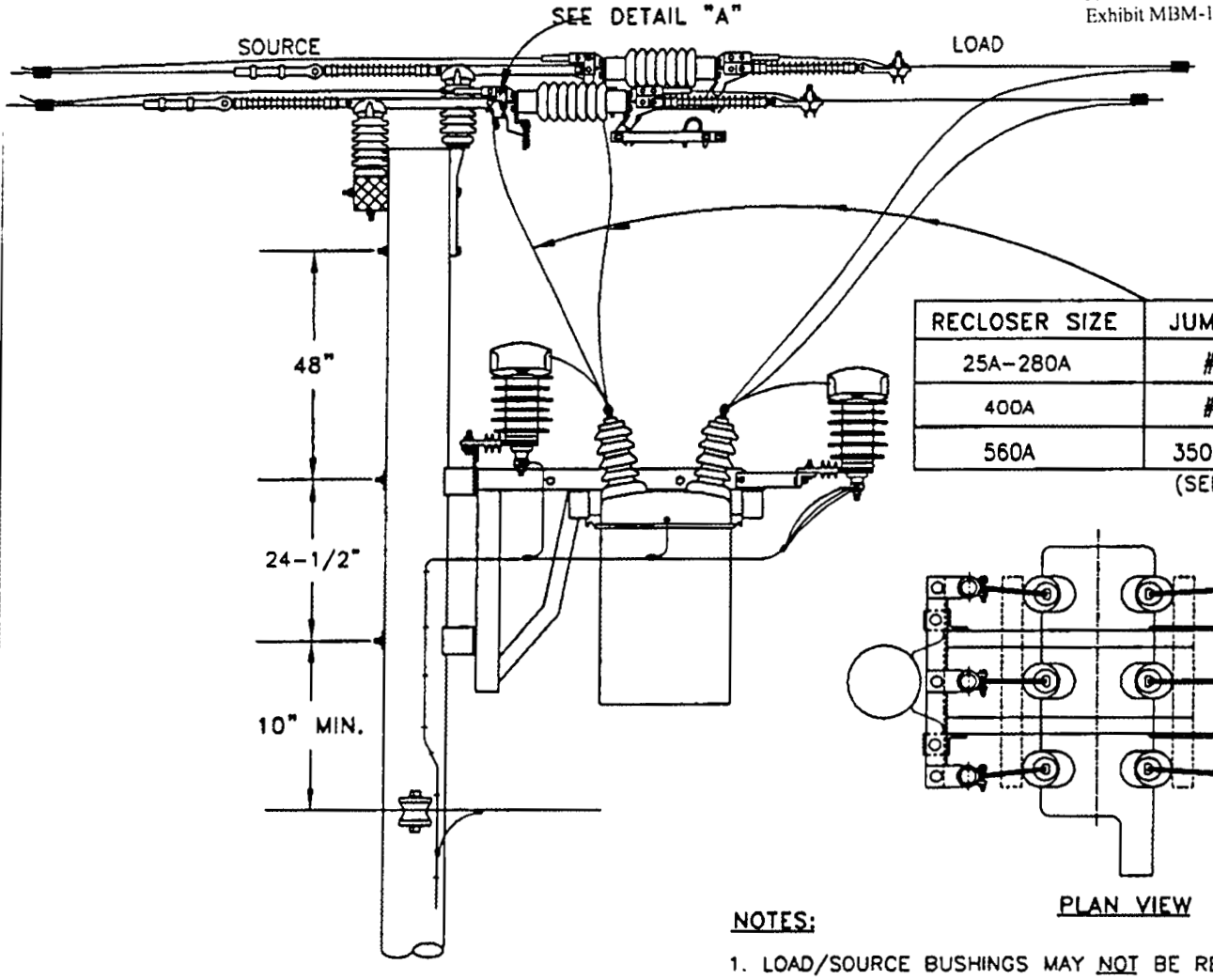
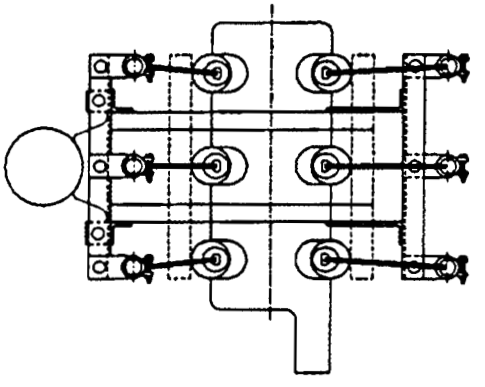


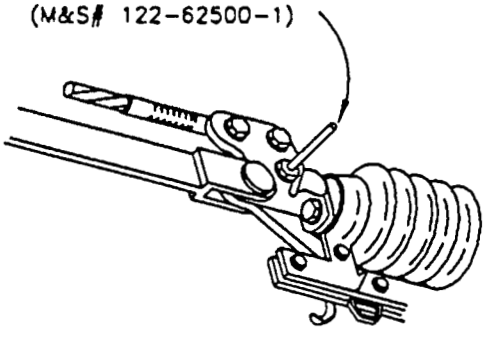
RECLOSER SIZE	JUMPER SIZE
25A-280A	#2/0 CU.
400A	#4/0 CU.
560A	350 KCMIL CU.

(SEE NOTE 4.)



PLAN VIEW

1/2" X 6" COPPER STUD FOR ATTACHING HOT LINE CLAMP. (M&S# 122-62500-1)



DETAIL "A"

NOTES:

1. LOAD/SOURCE BUSHINGS MAY NOT BE REVERSED.
2. INSTALL ARRESTERS ON SOURCE AND LOAD SIDE OF ALL RECLOSERS. ARRESTER MOUNTING BRACKET M&S# 334-552-001. TWO (2) REQUIRED. WHERE THIS ARRANGEMENT IS NOT UTILIZED, INSTALL INBOARD ARRESTERS ON ADJACENT POLE.
3. RELOSER MOUNTING BRACKET M&S# 142-260-009.
4. A STIRRUP-HOTLINE CLAMP SYSTEM IS NOT AVAILABLE FOR 560A RECLOSURES. USE MECHANICAL CONNECTOR M&S# 102-700-008.
5. THREE PHASE RECLOSERS ARE TO BE INSTALLED IN ACCESSIBLE LOCATIONS ON CONCRETE POLES, CLASS III-H, 4.7 KIP SPUN, OR STRONGER, WITH 8'-6' STEEL CROSSARM.

SUPERSEDES C-8A LAST REVISED ON 7-1-86

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
	1/9/07	ADDED POLE INFORMATION, NOTE 5	CEA	ELS	JJM
3	9/28/05	UPDATE DRAWING	CEA	ELS	JJM
2	9/22/04	ADD ANIMAL GUARD	LFV	ELS	JJM
1	6/30/93	REDRAW ON CAD, ADD TABLE FOR RECLOSER/JUMPER SIZE	IA	EMH	RJS

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: IA

DRAWN BY: EMH

DATE: 7/01/86

APPROVED: R.J. SALESKY
DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

NO SCALE

DISTRIBUTION AUTOMATION SECTIONALIZING SWITCHES NOTES AND DETAILS

C-9.0.4

Docket No. 070301-EI
FPL Storm Hardening Plan
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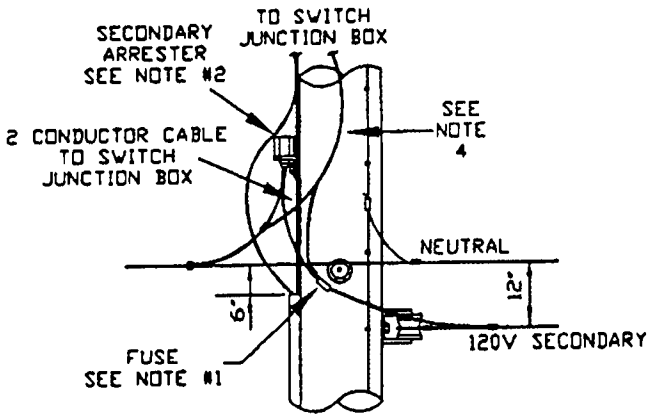
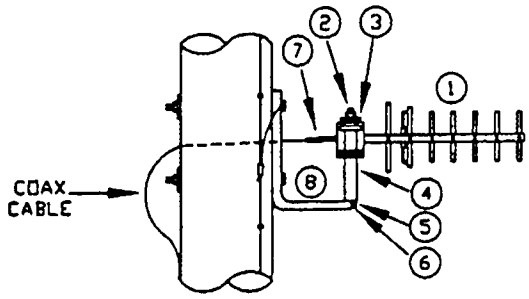
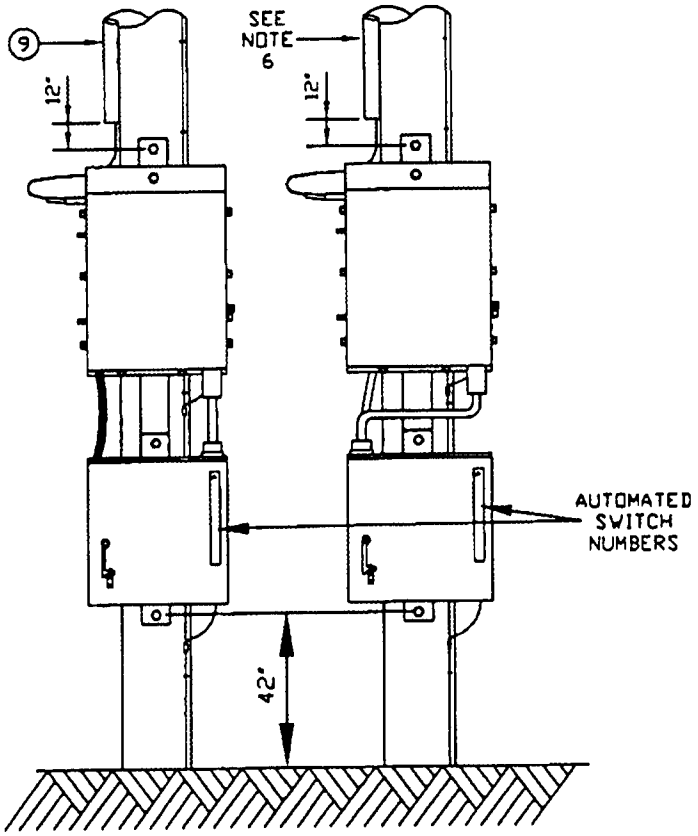


DETAIL "B"



DETAIL "A"

No.	DESCRIPTION
1	YAGI ANTENNA
2	10" X 1/2" BOLT
3	1 1/2" ROUND FLAT WASHER
4	1 1/4" GALVANIZED PIPE
5	1/2" SPRING WASHER
6	1/2" NUT
7	COAX CABLE
8	8" L-BRACKET
9	2" GALVANIZED PIPE



DETAIL "C"

NOTES:
1. USE M&S #531-57000-4, AND BA FUSE, M&S #531-07800-2.
2. USE SECONDARY ARRESTER M&S #334-08500-3.
3. INSTALL CONTROL CABINETS OPPOSITE TO VEHICLE TRAFFIC FLOW.
4. DUE TO IMPEDANCE REQUIREMENTS, LENGTH OF 120V AC LINE CONDUCTOR SHALL BE 54 INCHES MINIMUM BETWEEN SECONDARY AND SWITCH JUNCTION BOX.
5. INSTALL SWITCHES IN ACCESSIBLE AREAS ONLY.
6. BOND 2" CONDUIT SIMILAR TO STANDARD G-9 AND G-10.
7. DESIGNER TO SPECIFY DIRECTION OF ANTENNA.
8. DUE TO CONTROL CABLE LENGTHS, POLE LENGTHS SHOULD NOT EXCEED 45' FOR WOOD POLES AND 50' FOR CONCRETE POLES.
9. GROUND DISTRIBUTION AUTOMATION SWITCH BRACKETS, SWITCH CONTROL CABINETS, AND RTU CABINETS.
10. NEW OR REPLACEMENT POLES ARE TO BE CONCRETE, CLASS III-H, 47 KIP SPUN, OR STRONGER.

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
1	12/15/06	ADDED INFORMATION ON POLES	CEA	ELS	JJM

ORIGINATOR: C.A.

DRAWN BY: H. OHARRIZ

DATE: 4/18/90

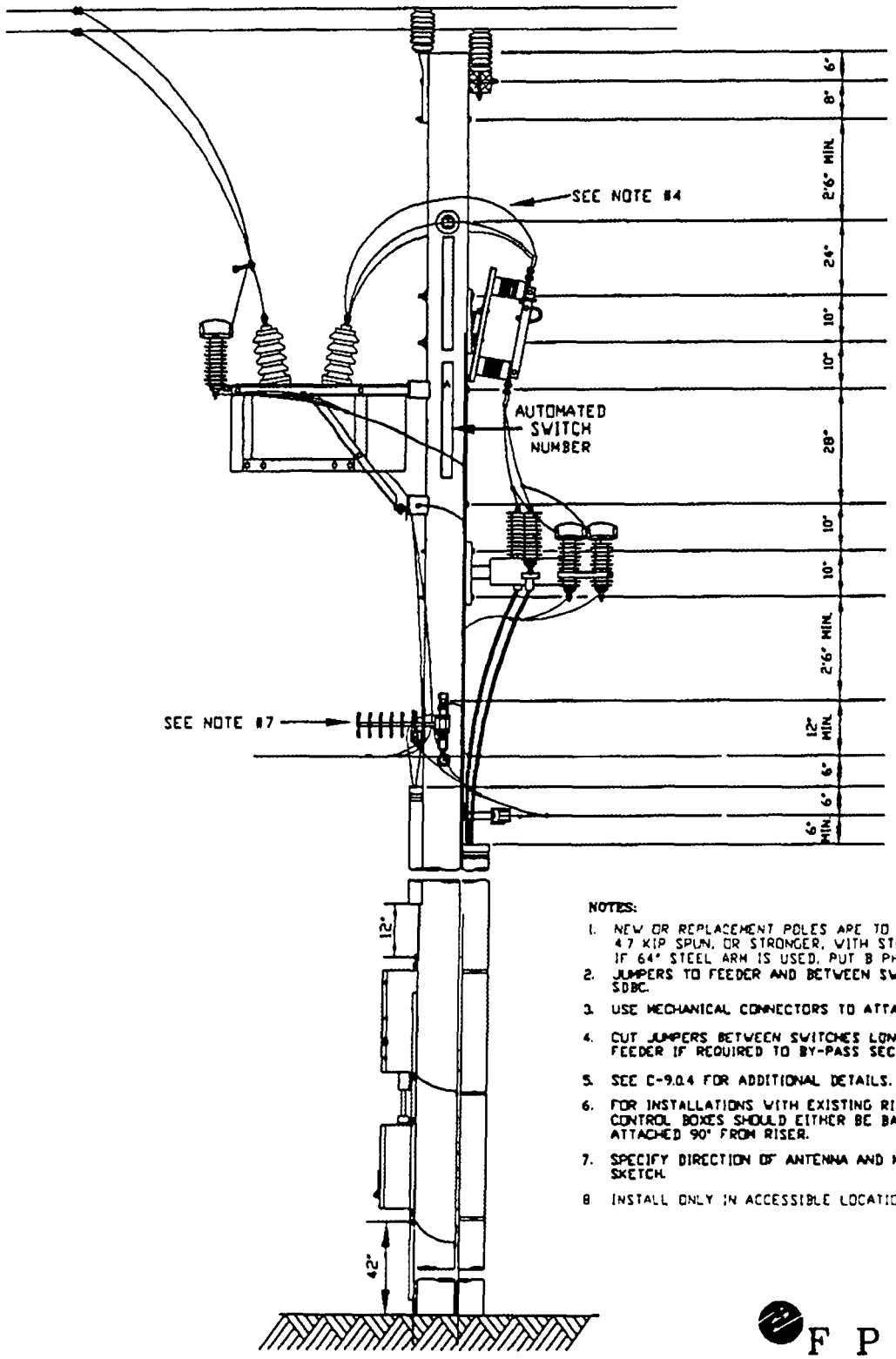
APPROVED: J. McEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

C-9.0.5	DISTRIBUTION AUTOMATION SECTIONALIZING SWITCHES, RISER INSTALLATION	C-9.0.5

COOPER POWER SYSTEM VACUUM SWITCH 13 & 23 KV

C



NOTES:

1. NEW OR REPLACEMENT POLES ARE TO BE CONCRETE, CLASS III-H, 4.7 KIP SPUN, OR STRONGER, WITH STEEL CROSSARMS. IF 64" STEEL ARM IS USED, PUT B PHASE IN POLE TOP POSITION
2. JUMPERS TO FEEDER AND BETWEEN SWITCHES TO BE 350 MCM SDBC.
3. USE MECHANICAL CONNECTORS TO ATTACH JUMPER TO FEEDER.
4. CUT JUMPERS BETWEEN SWITCHES LONG ENOUGH TO CONNECT TO FEEDER IF REQUIRED TO BY-PASS SECTIONALIZING SWITCH.
5. SEE C-9.0.4 FOR ADDITIONAL DETAILS.
6. FOR INSTALLATIONS WITH EXISTING RISER, THE RTU AND SWITCH CONTROL BOXES SHOULD EITHER BE BANDED TO THE POLE OR ATTACHED 90° FROM RISER.
7. SPECIFY DIRECTION OF ANTENNA AND MOUNTING FACE ON JOB SKETCH.
8. INSTALL ONLY IN ACCESSIBLE LOCATIONS.

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
2	11/15/06	ADDED INFORMATION ON POLES	CEA	ELS	JJM
1	10/7/04	ADD ANIMAL GUARD	LFV	ELS	JJM

ORIGINATOR: CA

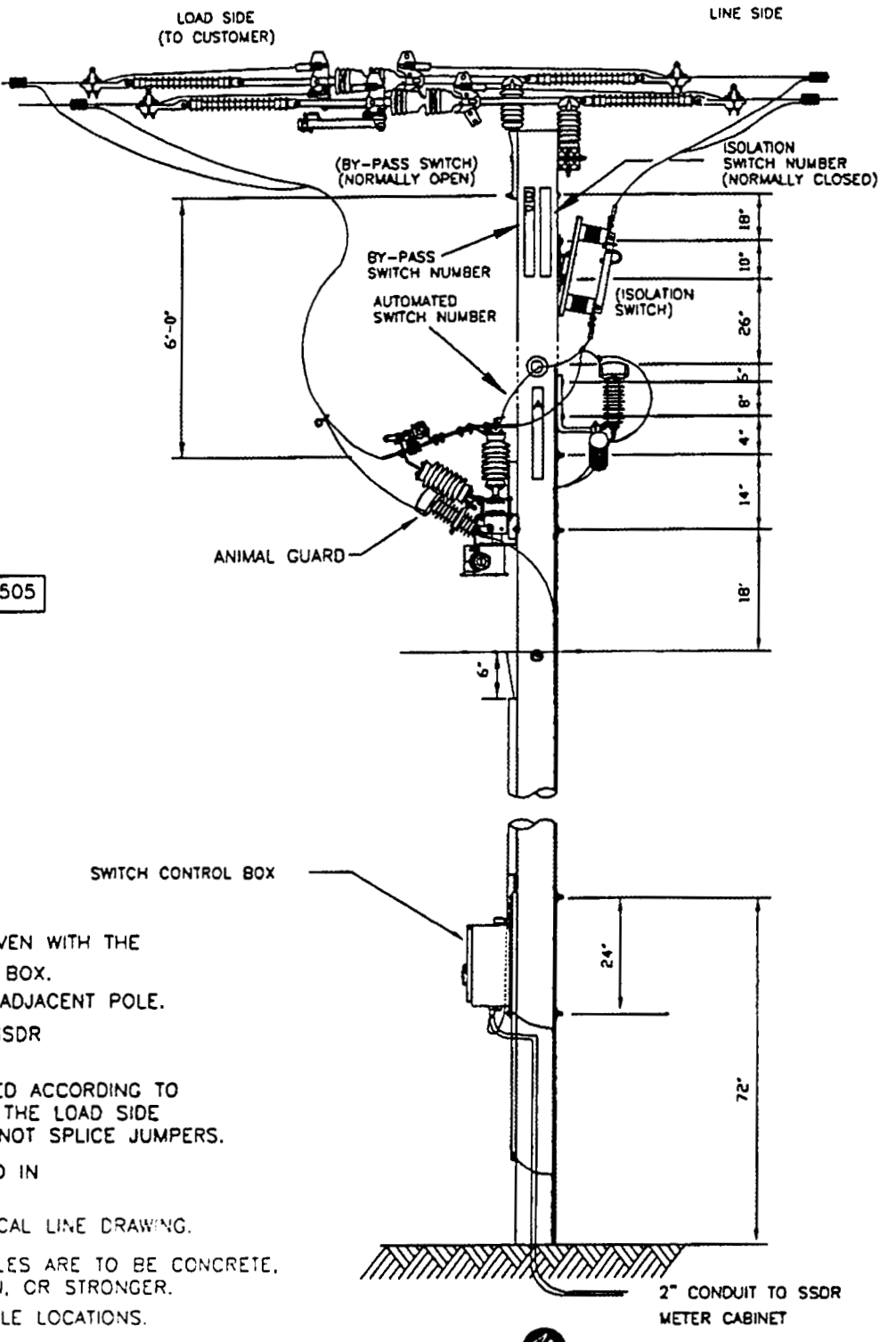
DRAWN BY: H. OHARRIZ

DATE: 10/02/90

APPROVED: R.K. CIELO
DIRECTOR, DISTRIBUTION ENGINEERING AND SERVICE PLANNING

NO SCALE

C-9.1.0	COMMERCIAL/INDUSTRIAL LOAD CONTROL (CILC) DISCONNECTING SWITCHES (BRIDGES HORIZONTAL AUTO-VECTOR SWITCHES)	C-9.1.0



M&S # 270-274-505

NOTES:

1. BRING RISER SHIELD TO EVEN WITH THE BOTTOM OF THE CONTROL BOX.
2. SSDR METER CABINET ON ADJACENT POLE.
3. BRING 120V SERVICE TO SSDR METER CABINET
4. JUMPERS SHOULD BE SIZED ACCORDING TO CONDUCTOR AMPACITY ON THE LOAD SIDE (TO THE CUSTOMER). DO NOT SPLICE JUMPERS.
5. CONTROL BOX IS INCLUDED IN SWITCH M&S NUMBER.
6. SEE C-9.1.1 FOR ELECTRICAL LINE DRAWING.
7. NEW OR REPLACEMENT POLES ARE TO BE CONCRETE, CLASS III-H, 4.7 KIP SPUN, OR STRONGER.
8. INSTALL ONLY IN ACCESSIBLE LOCATIONS.

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
5	11/15/06	ADDED INFROMATION ON POLES	CEA	ELS	JJM
4	10/6/05	UPDATE DRAWING	JFD	ELS	JJM
3	9/28/05	UPDATE DRAWING	CEA	ELS	JJM
2	10/07/04	ADD ANIMAL GUARD	LFV	ELS	JJM
1	6/17/03	ADD NOTE 5 AND M&S NUMBER	CEA	ELS	JJM

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: CA

DRAWN BY: J. SHOUP

DATE: 9/16/99

APPROVED: J. McEVOY
SUPERVISOR, OH/UG PRODUCT
SUPPORT SERVICES

NO SCALE

C-9.1.1

COMMERCIAL/INDUSTRIAL LOAD
INTERRUPTING (CILC) DISCONNECTING SWITCHES
(BRIDGES HORIZONTAL AUTO-VECTOR SWITCHES)

C-9.1.1

WIRING DIAGRAM FOR CILC SWITCH AND SSDR CABINET

C

NOTES:

1. THE ADDED ISOLATION TRANSFORMER AND RELAY IS TO MITIGATE SURGES THAT HAVE BLOWN FUSES IN THE PAST

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: CEA

DRAWN BY: E SCHILLING

DATE: 11/15/06 APPROVED: J McEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

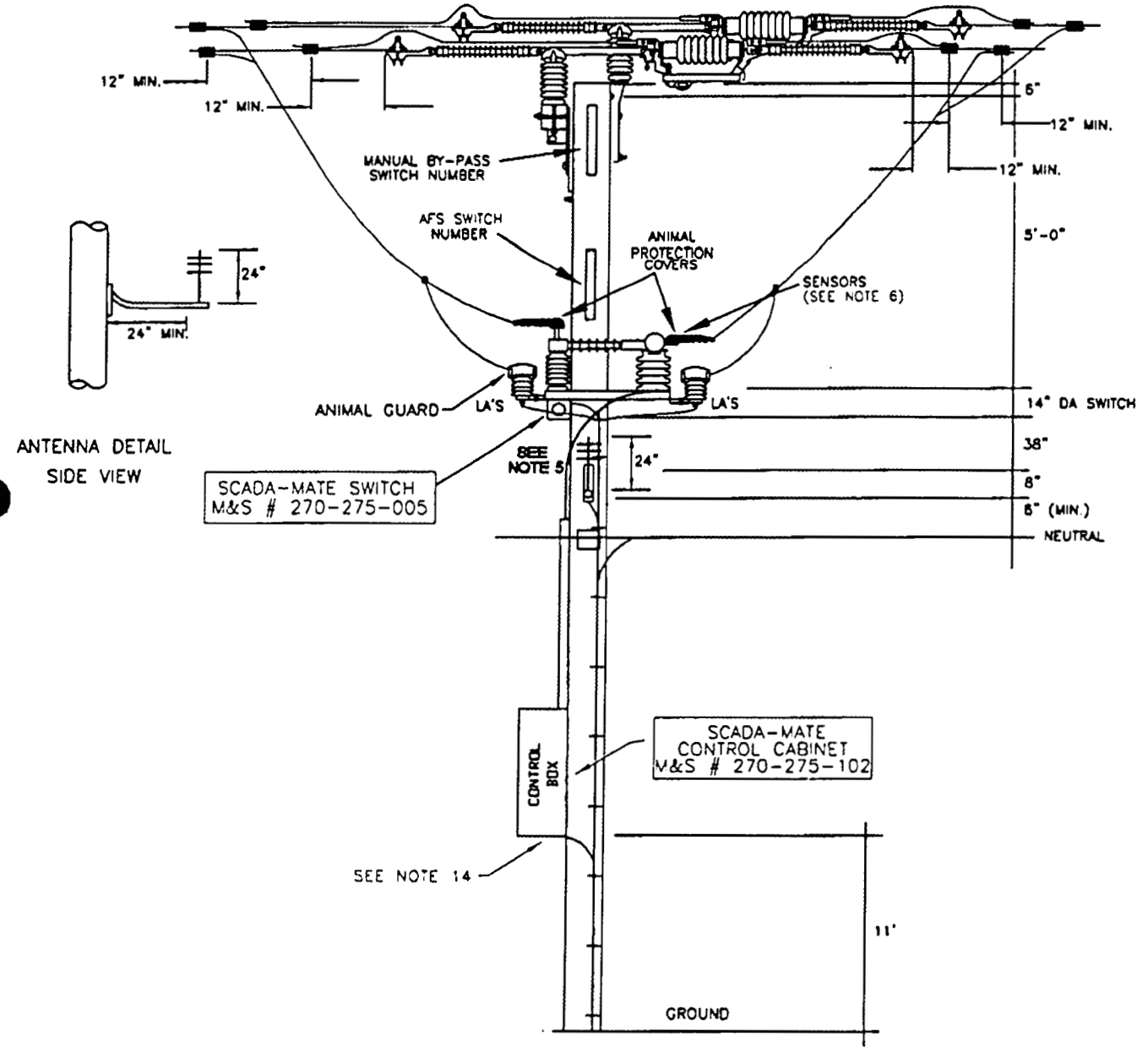
NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
1	11/15/06	ORIGINAL DRAWING	CEA	ELS	JJM

SCADA-MATE SWITCH

C-9.2.0

Docket No. 070301-EI
FPL Storm Hardening Plan
Exhibit MBM-1 Page 98 of 223

C



NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
8	11/15/05	MOVED NOTES TO NEXT PAGE	CEA	ELS	JJM
7	9/28/05	UPDATE DRAWING	CEA	ELS	JJM
6	8/16/05	POLE, CROSSARM & ANIMAL GUARD INFORMATION	CEA	ELS	JJM
5	10/7/04	ADD ANIMAL GUARD	LFV	ELS	JJM
4	3/8/04	REVISE FRAMING AND NOTES	CEA	ELS	JJM
3	10/30/03	UPDATE DRAWING (DIMENSIONS AND NOTES)	CEA	ELS	JJM
2	6/16/03	UPDATE DRAWING (DIMENSIONS AND NOTES)	CEA	ELS	JJM
1	09/19/02	UPDATE DRAWING (DIMENSIONS AND NOTES)	CEA	JES	JJM

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: CEA

DRAWN BY: J. SHOUP

DATE: 06/06/01

APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

NOTES:

1. SCADA-MATE SWITCHES ARE TO BE INSTALLED IN ACCESSIBLE LOCATIONS ONLY.

2. ALL NEW OR REPLACEMENT POLES ARE TO BE CONCRETE, CLASS III-H, 4.7 KIP SPUN CONCRETE, OR STRONGER. POLE CLASSES ARE TO BE INCREASED IF WIND LOADING GUIDELINES DICTATE.

3. USE 8'-6" STEEL CROSSARMS.

4. FRAME IN-LINE BY-PASS SWITCHES ON CROSSARM WITH B PHASE IN POLE TOP POSITION (SIMILAR TO C-4[illegible], EXCEPT NO ARRESTERS ON CROSSARM).

5. BY-PASS SWITCHES MAY BE LOCATED ON EITHER SIDE OF POLE.

6. CONTACT DISTRIBUTION RELIABILITY PLANNING FOR SWITCH AND VOLTAGE SENSOR ORIENTATION.

7. ANIMAL PROTECTION COVERS FOR THE TERMINAL PADS ARE STANDARD FOR NEW AND RETROFIT INSTALLATIONS AND ARE INCLUDED WITH THE SWITCH.

8. INSTALL RISER POLE TYPE ARRESTERS, ONE PER PHASE, ON EACH SIDE OF THE AFS SWITCH BRACKET (TOTAL OF SIX ARRESTERS).
   18KV FOR USE IN 23KV AREAS, M&S # 334-228-556

9. JUMPERS TO BE 568T FOR ALUMINUM FEEDERS, AMPACT TO FEEDER

10. GROUND AFS SWITCH BRACKETS, CONTROL CABINET, AND ASSOCIATED EQUIPMENT (ANTENNA BRACKET, ETC.)

11. MOUNT ANTENNA VERTICALLY ON INVERTED 2'-6" STREET LIGHT BRACKET ON STREET SIDE OF POLE. CLAMP ANTENNA SO FIBERGALASS PORTION IS FULLY ABOVE THE FLAT STEEL MOUNTING PLATE.

12. MAINTAIN AT LEAST 18 INCHES CLEARANCE FROM TOP AND SIDE OF ANTENNA.

13. PUT AFS SWITCH NUMBER ON DOOR OF CONTROL BOX.

14. BOND #6 CU TO POLE BOND USING CONNECTOR AT BOTTOM OF THE CONTROL BOX.

15. SCADA MATE SWITCH AN-GAP TO REMAIN CLOSED UNLESS REQUIRED FOR VISIBLE SEPARATION.

16. CONNECT THE BATTERY TO THE CHARGING CIRCUIT INSIDE THE CONTROLLER BY FIRST OPENING THE CONTROL CABINET DOOR, OPENING THE SWING-OUT CONTROL PANEL, THEN [illegible] THE BATTERY LEAD CONNECTOR TO THE BATTERY.

NEW STANDARD
PREVIOUSLY PART OF
C-920

F P L
OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG	DRAWN	APPR
1	11/16/05	ORIGINAL DRAWING	CEA	ELS	JJM

ORIGINATOR: CEA — DRAWN BY: E SCHILLING

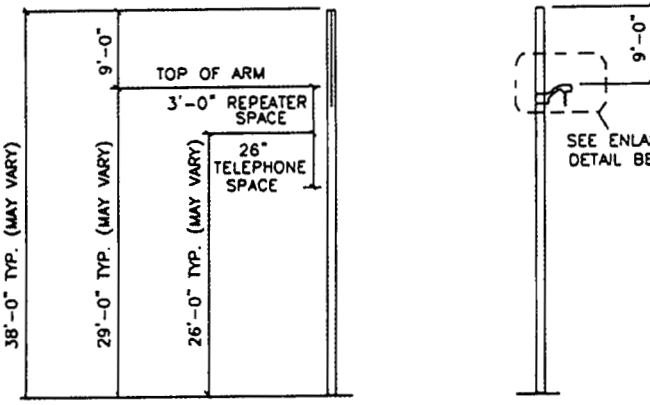
DATE 11/16/05 APPROVED: JJ VCEVOY — NO SCALE
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

S & C "SCADA-MATE" RADIO REPEATER

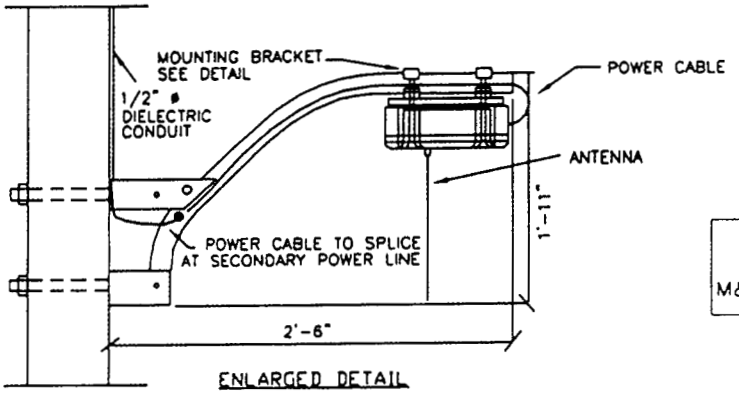
C-9.2.2

Docket No. 070301-EI
FPL Storm Hardening Plan
Exhibit MBM-1 Page 100 of 223

C

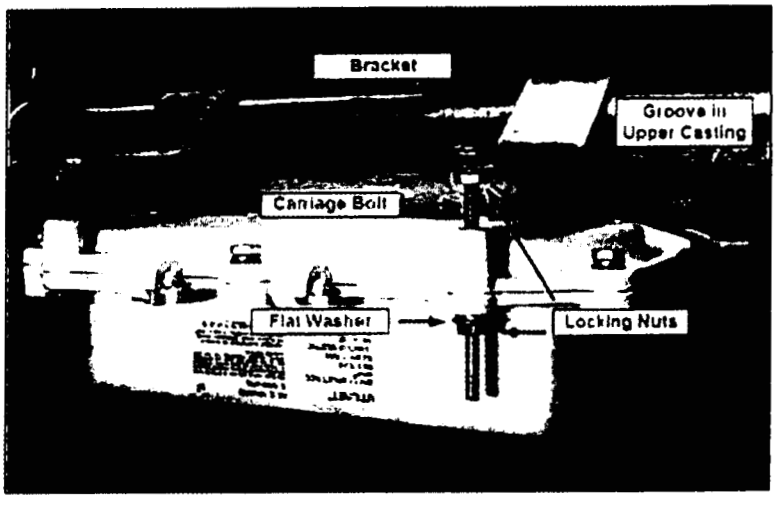


JOINT USE POLE-WITH 2' - 6" STREET LIGHT BRACKET
SCALE: N.T.S.



ENLARGED DETAIL
SCALE: N.T.S.

SCADA-MATE
REPEATER RADIO
M&S # 270-275-200



NOTES

1. THE ILLUSTRATION TO THE LEFT SHOWS THE RADIO AS PROVIDED AND SHOWS THE PROPER MOUNTING TECHNIQUE, WITH THE CARRIAGE BOLTS POINTED DOWN AND A FLAT WASHER BETWEEN THE RADIO CASTING AND THE LOWER LOCKING NUT.

2. THE REPEATER IS TO BE INSTALLED ON A 2'-6" STREET LIGHT BRACKET OR ON AN EXISTING STREET LIGHT BRACKET, AS APPROPRIATE.

3. RADIO REPEATER IS TO BE INSTALLED ON HORIZONTAL PART OF BRACKET

4. SPLICE POWER CABLE IF NEEDED. POLARITY IS NOT AN ISSUE

5. USE 120V SOURCE

STANDARD RENUMBERED, FORMERLY C-9.2.1

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
2	11/16/08	UPDATE DRAWING AND ADD NOTES	CEA	ELS	JJM
1	10/30/03	UPDATE DIMENSIONS	CEA	ELS	JJM

ORIGINATOR: CEA
DRAWN BY: J. SHOUP
DATE: 06/06/01
APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES
NO SCALE

POLE SETTING, GUYING AND BRACING

D-2.0.0

DRAWINGS CONTAINED IN SECTION D SHOW DATA REFERRING TO THE SETTING, GUYING AND BRACING OF POLES. THE METHODS AND DATA GIVEN SHOULD BE ADHERED TO AS CLOSELY AS FIELD CONDITIONS PEMIT IN THE INTEREST OF UNIFORM CONSTUCTION AND THE DEVELOPMENT OF MAXIMUM STRENGTH OF SUPPORTING STRUCTURES.

POLE SETTING

REFER TO STANDARD D-15 FOR INFORMATION AND DATA ON POLE AND ANCHOR STAKING.

POLES SHALL BE LOCATED IN ALIGNMENT AND SHALL BE SET TO STAND VERTICAL WHEN THE LINE IS COMPLETED. POLES LOCATED AT ANGLES, TERMINALS, CROSSINGS, OR POINTS OF EXCESSIVE STRAIN SHOULD BE CAREFULLY SELECTED FOR MAXIMUM STRENGTH.

WOOD POLES WHICH HAVE DECAYED AT THE GROUND LINE, BEYOND A POINT WHERE THEY MAY NO LONGER BE RELIED UPON AS AN ADEQUATE SUPPORT, MAY BE SPLINTED WHERE PRACTICABLE IF THEIR UPPER PORTION IS IN GOOD CONDITION AND IF SPLINTING IS NOT OBJECTIONABLE FROM THE STANDPPOINT OF APPERANCE OR OTHER REASON. AS AN EMERGENCY MEASURE, A POLE MAY BE STUBBED INSTEAD OF SPLINTED. CONCRETE POLES ARE NEVER SPLINTED EXCEPT IN EMERGENCIES.

GUYING

GUY ANCHORS SHALL, WHERE POSSIBLE, BE SO LOCATED THAT THE HORIZONTAL DISTANCE MEASURED FROM THE POLE AT THE GROUND LINE TO THE GUY ANCHOR WILL BE EQUAL TO THE HEIGHT ABOVE GROUND AT WHICH THE GUY IS ATTACHED TO THE POLE. GUYS SHALL BE ATTACHED TO THE POLES IN SUCH A MANNER AS TO INTERFERE AS LITTLE AS POSSIBLE WITH LINEMEN CLIMBING OR WORKING THEREON. THE GROUND END OF GUYS SHALL HAVE A GUY MARKER (GUY GUARD) INSTALLED AT ALL LOCATIONS.

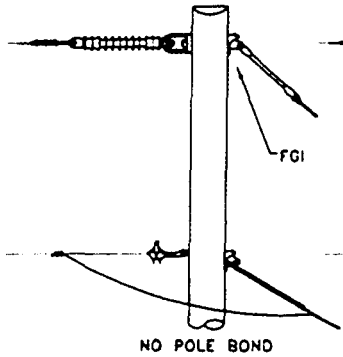
NOTE: SETTING POLES AND ANCHORS IN OR ADJACENT TO WETLANDS AREAS MAY REQUIRE ENVIRONMENTAL CONTROL MEASURES. CONTACT THE ENVIRONMENTAL SPECIALIST FOR SPECIFIC REQUIREMENTS.

GUY STRAIN INSULATORS

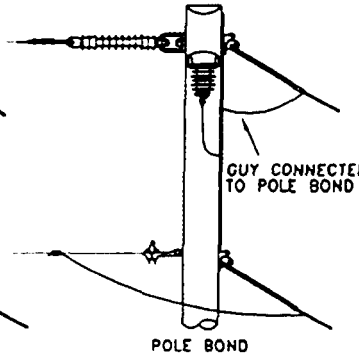
NESC REQUIRES THAT ALL GUYS BE EFFECTIVELY GROUNDED. EFFECTIVELY GROUNDED CAN BE ACCOMPLISHED BY CONNECTING THE GUY WIRE TO A POLE BOND WHERE THE BOND IS CONNECTED TO A DRIVEN GROUND OR CONNECTED TO THE SYSTEM NEUTRAL. GROUNDING OF THE GUY IS NOT REQUIRED IF A FIBERGLASS GUY STRAIN INSULATOR (FGI) IS INSTALLED IN A MANNER TO PREVENT ANY CONTACT BETWEEN AN ENERGIZED CONDUCTOR AND THE GUY WIRE.

APPLICATION:

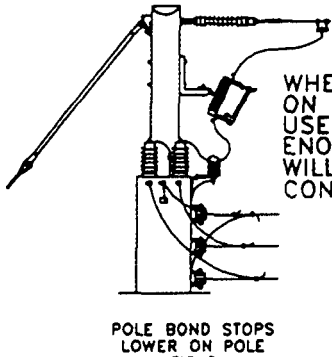
GUY STRAIN INSULATORS ARE USED ON WOOD POLES WHENEVER A GUY IS INSTALLED ABOVE THE NEUTRAL FOR 13KV AND ABOVE IN NON-CONTAMINATED AREAS. UNLESS REQUIRED DUE TO REDUCED CLEARANCES, GUY STRAIN INSULATORS ARE TYPICALLY NOT REQUIRED IN CONTAMINATED AREAS OR ON CONCRETE POLES SINCE ALL THE HARDWARE INCLUDING THE GUY WIRES ARE BONDED TO THE SYSTEM NEUTRAL AND / OR A DRIVEN GROUND.



NO POLE BOND
FIG. 1



POLE BOND
FIG. 2



POLE BOND STOPS
LOWER ON POLE
FIG 3

WHERE POLE BOND STOPS LOWER ON THE POLE, AN FGI SHOULD BE USED. THE FGI MUST BE LONG ENOUGH SO THAT THE METAL END WILL BE BELOW THE LAST ENERGIZED CONDUCTOR.

GUY STRAIN INSULATORS CAN BE USED TO OBTAIN A 25% REDUCTION IN THE REQUIRED CLEARANCE BETWEEN THE GUY AND CONDUCTOR(S) WHERE NEEDED (SEE B-6, NOTE 8). ALL SLACK SPAN INSTALLATIONS ARE TO USE A GUY STRAIN INSULATOR WHERE THE SLACK CONDUCTORS ARE ADJACENT TO THE DOWNGUY. INSTALLATIONS WHERE A DOWNGUY GOES BETWEEN CONDUCTORS SHOULD ALSO USE A GUY STRAIN INSULATOR.

BONDED GUYS

WHERE THE GUY IS TO BE BONDED, ATTACH THE BOND WIRE TO THE GUY WIRE USING CONNECTOR M&S #120-44700-9. DO NOT ATTACH BOND WIRE TO PREFORMED GUY GRIP.

SUPERSEDES D-2.0.0 LAST REVISED ON 1-29-92

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
3	1/23/07	UPDATE NOTES	JNM	ELS	JJM
2	9/22/05	UPDATE DRAWING AND NOTES	JNM	ELS	JJM
1	8/29/03	ADD REF TO WETLANDS	JNM	ELS	JJM
0	9-30-94	REDRAWN ON CAD AND ADDED NESC REQUIREMENT	ARR	EMR	RJS

ORIGINATOR: ARR DRAWN BY: EMR

DATE: 9-30-94 APPROVED: R.J. SALESKY NO SCALE
DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

D-3.0.0

POLE SETTING DEPTHS AND SOIL CONDITIONS

D-3.0.0

POLE SETTING DEPTHS

MINIMUM POLE SETTING DEPTHS IN EARTH / GOOD SOIL (FT)

	CONCRETE POLES							WOOD POLES
POLE LENGTH	TYPE "O"	SU	IIIG	IIIA	IIIH	12 KIP	SPUN	WOOD
20								4.5
25								5
30								5.5
35	7	7.5	9					6
40			9	10	11.5	13		6.5
45			9	10	11.5	13.5		7
50			9.5	10	11.5	13.5	11	7
55			9.5		12	14	12	7.5
60					12	14	12.5	8
65					12		13	8.5
70							13.5	9
75								9.5
80								10

MINIMUM POLE SETTING DEPTHS IN ROCK* (FT)

	CONCRETE POLES							WOOD POLES
POLE LENGTH	TYPE "O"	SU	IIIG	IIIA	IIIH	12 KIP	SPUN	WOOD
20								4
25								4.5
30								5
35	6	6	7.5					5.5
40			7.5	8	9.5	11		5.5
45			7.5	8.5	9.5	11		6
50			7.5	8.5	9.5	11	11	6
55			8		9.5	11.5	12	6
60					10	11.5	12.5	6.5
65					10		13	6.5
70							13.5	7
75								7.5
80								8

* FOR SOILS THAT ARE 90% ROCK OR HARD CLAY.

D

POLE SETTING DETAILS AND SOIL CONDITIONS:

UNDER NORMAL CONDITIONS, A CONCRETE POLE CAN BE SET DIRECTLY INTO AN AUGURED HOLE, BACKFILLING WITH THE SOIL AUGURED FROM THE HOLE, TAMPING THE SOIL IN LAYERS FOR A GOOD TIGHT FIT.

IN SITUATIONS WHERE POLES HAVE A LARGE LOAD, IMBALANCE LOAD OR WHERE SOIL CONDITIONS ARE QUESTIONABLE, IT MAY REQUIRE ADDITIONAL CONSIDERATIONS, IN MOST CASES, ALL THAT MAY BE REQUIRED IS TO INCREASE THE BEARING SURFACE BELOW GRADE. THIS CAN BE ACHIVED IN A NUMBER OF WAYS. THE EASIEST IS SETTING THE POLE DEEPER. ANOTHER METHOD IS TO AUGER THE SETTING HOLE, 8" TO 10" GREATER IN DIAMETER THAN THE POLE BUTT. BACKFILL WITH CONCRETE OR A FLOWABLE FILL. THIS WILL HELP MEET THE STRENGTH REQUIREMENTS AND ALLOW FOR EASY REMOVAL IF DAMAGE OCCURS TO THE POLE. FLOWABLE FILL IS A LOW STRENGTH, SLURRY-LIKE MATERIAL WITH THE CONSISTENCY OF PANCAKE BATTER, WHICH ARRIVES ON THE JOB SITE IN A READY MIX TRUCK. THE MATERIAL IS SELF-LEVELING AND REACHES 95 PERCENT OR MORE COMPACTION WITHIN A FEW HOURS OF PLACEMENT. IT GENERALLY IS MADE FROM A BLEND OF CEMENT, FLY ASH, SAND AND WATER.

IF FIELD CONDITIONS DICTATE THE NEED TO MAINTAIN THE WALLS OF AN AUGURED HOLE, USE A SOIL STABILIZER, M&S #522-125-575. A SODA ASH COMPOUND M&S #522-126-571 MAY BE NEEDED IN CONJUCTION WITH THIS SOIL STABILIZER.

FOR LEANING POLES IN AREAS WITH NO STANDING WATER, A POLE SETTING FOAM IS AVAILABLE, M&S #522-100-000. IT EXPANDS TO FILL THE PERIPHERAL VOID BETWEEN THE POLE AND THE HOLE.

GENERAL GUIDLINES FOR TYPICAL SOILS:

GOOD SOIL
COMPACT WELL GRADED SAND AND GRAVEL, HARD CLAY OR WELL GRADED FINE AND COARSE SAND AND NO STANDING WATER. USE AS IS FOR BACKFILL.

MEDIUM SOIL
COMPACT FINE SAND AND CLAY, COMPACT SANDY LOAM, LOOSE COARSE SAND AND GRAVEL AND NO STANDING WATER. BACKFILL WITH ROCK, A 57 STONE OR SMALLER AND TAMPING EACH LAYER VERY WELL.

POOR SOIL
SOFT CLAY, CLAY LOAM, POORLY COMPACTED SAND OR CLAYS CONTAINING LARGE AMOUNTS OF SILTS, STANDING WATER DURING WET SEASON. MAY REQUIRE BACKFILLING THE HOLE WITH CONCRETE OR A FLOWABLE FILL.

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR
1	6/6/06	NEW DRAWING	RJO	ELS	JJM

ORIGINATOR: A.A. DRAWN BY: J.H.

DATE: 7-1-87 APPROVED R. K. CIELO
DIRECTOR, DISTRIBUTION ENGINEERING AND SERVICE PLANNING

NO SCALE

D-7.0.0

METHODS OF ATTACHING GUYS FOR WOOD AND CONCRETE POLES

D-7.0.0

D

HEAVY DUTY ATTACHMENT

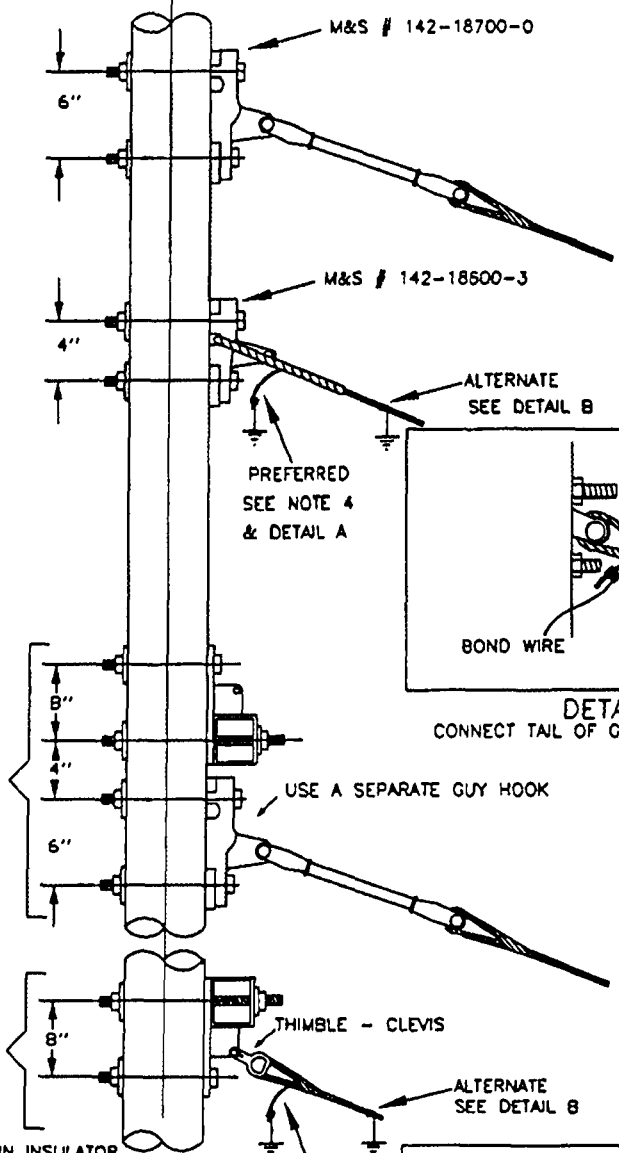
FOR GUYS TO 9/16" GALV. USE 3/4" BOLTS AND 4" SQUARE WASHERS. (CURVED WASHER ON WOOD POLES) (FLAT WASHER ON CONCRETE POLES)

USE THE HEAVY DUTY ATTACHMENT WITH 6" MOUNTING HOLES ON ALL SPUN CONCRETE POLES

MEDIUM DUTY ATTACHMENT

FOR GUYS TO 7/16" GALV. USE 5/8" BOLTS AND 4" SQUARE WASHERS. (CURVED WASHER ON WOOD POLES) (FLAT WASHER ON CONCRETE POLES)

SYMBOL ⏚ MEANS TO POLE BOND

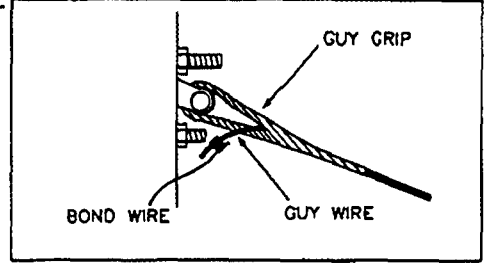


STEEL CROSSARM ATTACHMENT

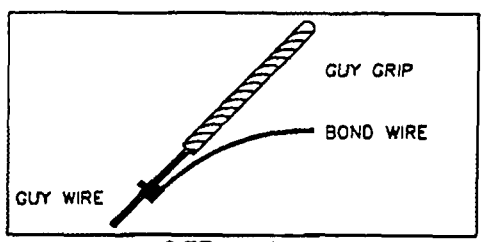
(SEE NOTE 1)

WOOD POLE ARRANGEMENT

CONCRETE POLE ARRANGEMENT



DETAIL A
CONNECT TAIL OF GUY WIRE TO POLE BOND



DETAIL B
CONNECT POLE BOND WIRE TO TO GUY WIRE BELOW GUY GRIP

NOTES:
1. ALL GUYS SHALL BE BONDED EXCEPT WHERE A GUY STRAIN INSULATOR IS USED. GUY STRAIN INSULATORS ARE USED ON WOOD DEADEND POLES WHENEVER A GUY IS INSTALLED ABOVE THE NEUTRAL FOR 13kV AND ABOVE IN NON-CONTAMINATED AREAS. THEY ARE NOT USED ON CONCRETE POLES AND ARE NOT REQUIRED ON WOOD DEADEND POLES (OR POLE GUYED FOR ANY REASON) IF PROTECTED BY SURGE ARRESTERS. IN CASES WHERE A DOWNGUY IS LOCATED ADJACENT TO CONDUCTORS, THE GUY SHALL EITHER USE A GUY STRAIN INSULATOR THAT IS LONG ENOUGH TO EXTEND BELOW THE LOWEST CONDUCTOR OR BE BONDED.
2. GUY STRAIN INSULATORS CAN BE USED TO OBTAIN A 25% REDUCTION IN THE REQUIRED CLEARANCE BETWEEN THE GUY AND CONDUCTOR(S) WHERE NEEDED (SEE B-6, NOTE 8). ALL SLACK SPAN INSTALLATIONS ARE TO USE A GUY STRAIN INSULATOR WHERE THE SLACK CONDUCTORS ARE ADJACENT TO THE DOWNGUY. INSTALLATIONS WHERE A DOWNGUY GOES BETWEEN CONDUCTORS SHOULD ALSO USE A GUY STRAIN INSULATOR.
3. GUYS WITHOUT FIBERGLASS INSULATORS ARE TO BE BONDED TO THE POLE GROUND. GUYS WITH FIBERGLASS INSULATORS WILL NOT BE BONDED. SEE SECTION "G" FOR METHODS OF BONDING.
4. WHERE THE GUY IS TO BE BONDED, ATTACH THE BOND WIRE TO THE GUY WIRE USING CONNECTOR M&S #120-44700-9. DO NOTE ATTACH BOND WIRE TO PREFORMED GUY GRIP (OR ANY OTHER PART OF THE GUYING INSTALLATION).

SUPERSEDES D-7 LAST REVISED 1-4-88
(REMOVED LIGHT DUTY ATTACHMENT)

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
4	1/23/07	ADD NOTE	JNM	ELS	JJM
4	6/30/03	ADD M&S #'S FOR GUY HOOKS	JNM	ELS	JJM
3	8/20/02	ADDED DETAILS A & B	JNM	JES	JJM
2	7/30/01	ADDED REFERENCE TO NOTE 4	JNM	JES	JJM
1	3/15/91	REVISED GUY GROUNDING	A.S	H.O.	G.W.H

ORIGINATOR: AS

DRAWN BY: JRF

DATE: 3/01/89

APPROVED: G. W. HAMMOND III
DIRECTOR, DISTRIBUTION ENGINEERING AND SERVICE PLANNING

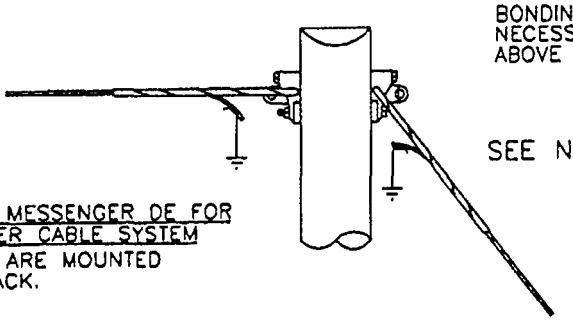
NO SCALE

D-7.0.1

METHOD OF ATTACHING GUYS FOR WOOD OR CONCRETE POLES

D-7.0.1

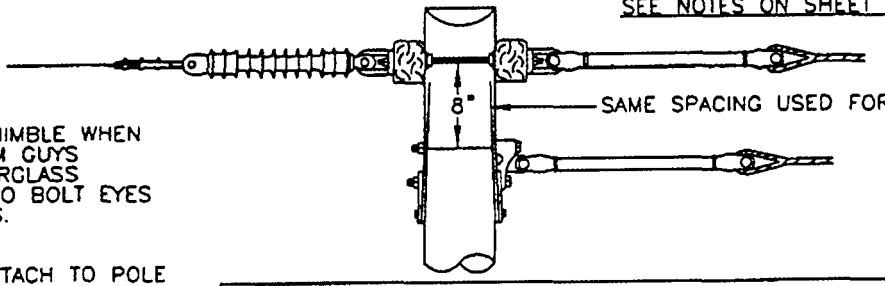
BONDING OF GUYS AT STUB POLES IS NECESSARY ONLY IF THERE ARE CIRCUITS ABOVE THE GUYS ON THE STUB POLE.



SEE NOTE 1

GUY STUB POLE OR MESSENGER DE FOR HENDRIX AERIAL SPACER CABLE SYSTEM
GUY ATTACHMENTS ARE MOUNTED BACK TO BACK.

FIBERGLASS STRAIN INSULATORS ARE NOT USED ON CONCRETE POLES
SEE NOTES ON SHEET D-7.0.0

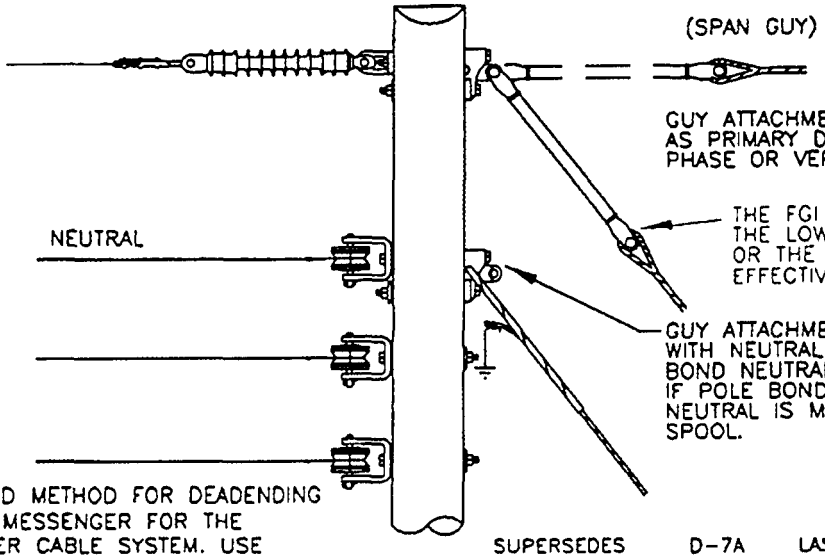


ARM GUYS
USE A GUY THIMBLE WHEN ATTACHING ARM GUYS (WITHOUT FIBERGLASS INSULATORS) TO BOLT EYES ON D.A. BOLTS.

SPAN GUYS
SPAN GUYS ATTACH TO POLE BY SAME METHODS AS SHOWN FOR DOWN GUYS.

FIBERGLASS GUY STRAIN INSULATORS				
	18"	78"	90"	120"
5/16"	131-040-002 *	131-0520-001 *	N/A	N/A
7/16" & 9/16"	131-044-008	N/A	131-060-003	131-070-009

* FOR USE WITH MEDIUM DUTY GUY ATTACHMENT ONLY (M&S 142-186-003)



GUY ATTACHMENT USES SAME BOLT AS PRIMARY DEADEND FOR SINGLE PHASE OR VERTICAL PRIMARY.

THE FGI MUST EXTEND DOWN BELOW THE LOWEST ENERGIZED CONDUCTOR OR THE GUY WIRE MUST BE EFFECTIVELY GROUNDED.

GUY ATTACHMENT MOUNTED BACK TO BACK WITH NEUTRAL FORK.
BOND NEUTRAL GUY TO SYSTEM NEUTRAL IF POLE BOND IS NOT AVAILABLE AND NEUTRAL IS MOUNTED ON SECONDARY SPOOL.

NOTE:

1. SHOWN IS PREFERED METHOD FOR DEADENDING THE 1/2" (7#6 AWA) MESSENGER FOR THE HENDRIX AERIAL SPACER CABLE SYSTEM. USE HEAVY DUTY GUY HOOK (M&S 142-187-000) WITH 3/4" BOLTS.

SUPERSEDES D-7A LAST REVISED ON 7-1-88

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
3	1/23/07	ADD NOTE	JNM	ELS	JJM
[illegible]	9/21/05	ADD NOTE TO TABLE	JNM	ELS	JJM
2	6/30/03	ADD M&S #'S FOR GUY STRAIN INS.	JNM	ELS	JJM
1	7/28/99	ADD NOTE & CHANGE TEXT	JNM	PRH	JJM
0	8/9/96	CHANGED PORCELAIN SUSPENSION INSULATORS TO POLYMER	PMG	RAS	JJM

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: PMG DRAWN BY: RAS

DATE: 8/9/96 APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

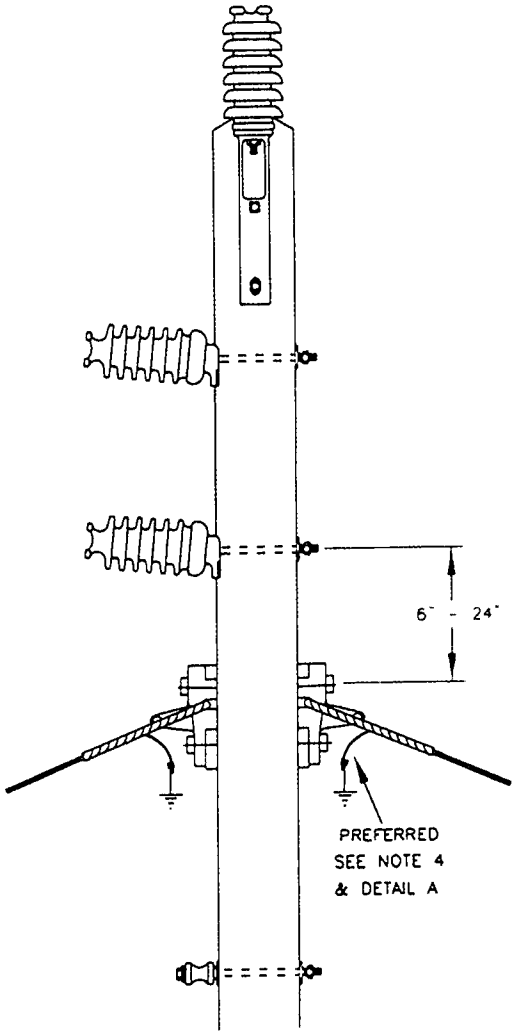
NO SCALE

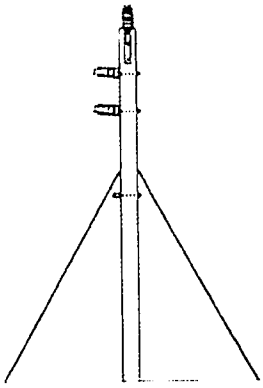
D-13.0.0

STORM GUYING

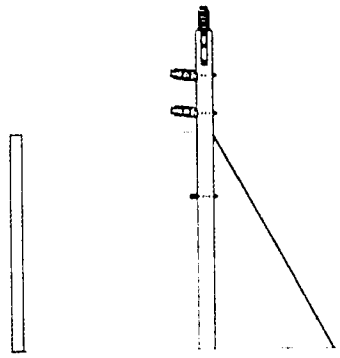
D-13.0.0

D





STORM GUYS USING
DOWN GUYS



STORM GUY COMBINATION
DOWN GUY AND SPAN GUY

STORM GUYS	
GUY SIZE	ALLOWABLE GUY TENSION
5/16	10080
7/16	18720
9/16	30330

NOTES:

1. STORM GUYS ARE INSTALLED BACK TO BACK PERPENDICULAR TO THE POLE LINE.

2. EITHER ONE OR BOTH OF THE STORM GUYS MAY BE INSTALLED AS SPAN GUYS TO A GUY STUB POLE.

3. ALL GUYS ARE TO BE EFFECTIVELY GROUNDED UNLESS FIBERGLASS GUY STRAIN INSULATORS ARE USED. (REFER TO D-2.0.0)

4. STORM GUYS ALSO MAY BE INSTALLED ON CROSSARM POLES.

MINIMUM STORM GUY SIZE MODIFIED VERTICAL FRAMING WITH JOINT USE			
RATIO OF LEAD LENGTH/ATTACHMENT HEIGHT	80%	90%	100%
1 & 2 PHASE LINES	5/16	5/16	5/16
3 PHASE LINES	7/16	7/16	7/16

OPTIMUM GUY IS WHERE LEAD LENGTH = ATTACHMENT HEIGHT (RATIO=100%)
IF DOWN GUYS CANNOT BE INSTALLED SPAN GUYS TO GUY STUB POLES CAN BE USED

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
1	2/27/07	UPDATE DWG AND NOTES	JNM	ELS	JJM
0	1/23/07	ORIGINAL DRAWING	JNM	ELS	JJM

ORIGINATOR: JNM

DRAWN BY: E.SCHILLING

DATE: 1/23/07

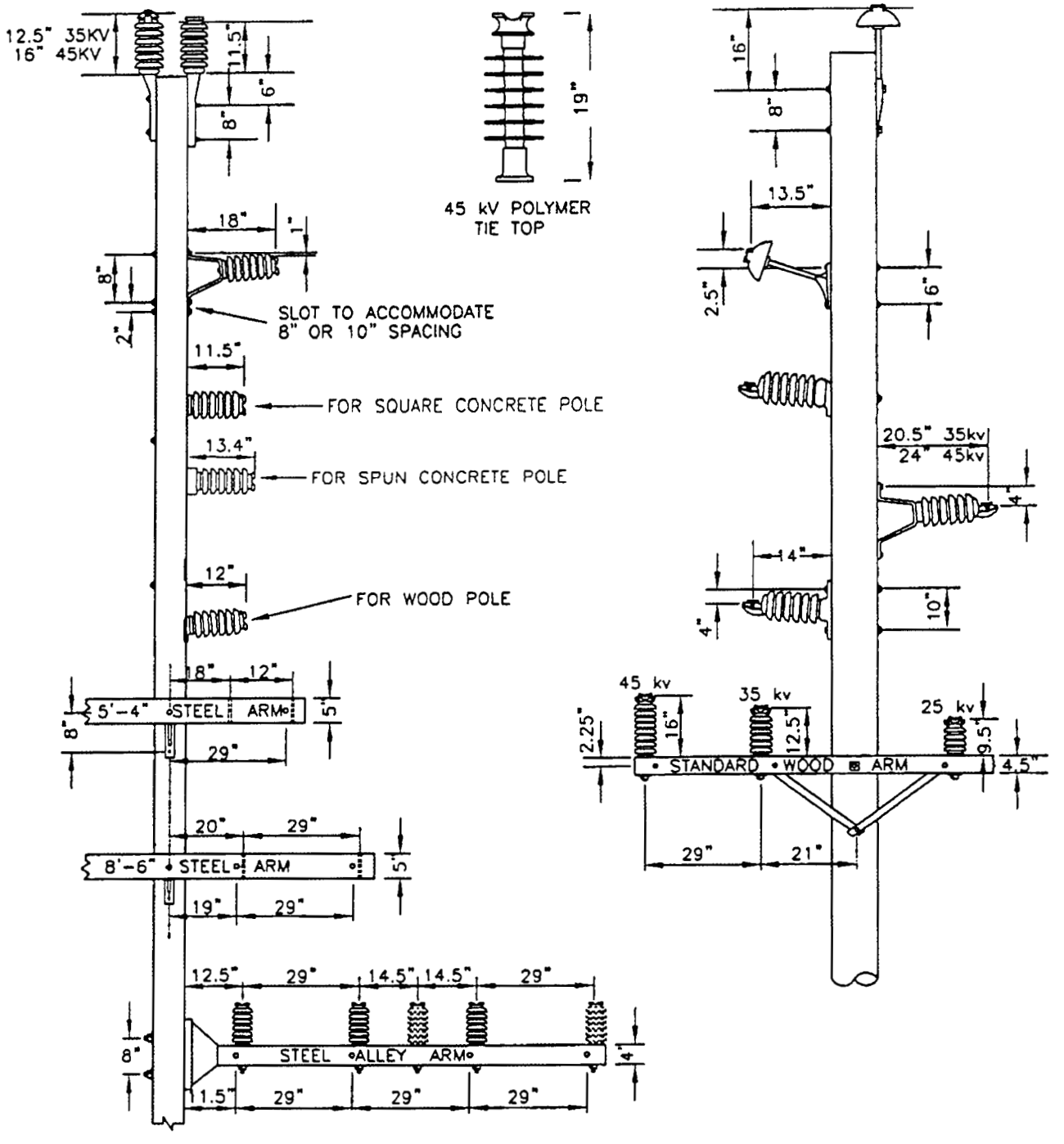
APPROVED: J.J. McEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

E-3.0.0

OVERHEAD EQUIPMENT DIMENSIONS

E-3.0.0



NOTE:

SOME DIMENSIONS WILL VARY SLIGHTLY WITH MANUFACTURER, TOLERANCES, ETC., BUT

SUPERSEDES E-3 LAST REVISED ON 3-1-89

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
2	12/5/06	UPDATE DRAWING	LFV	ELS	JJM
1	9-7-99	ADDED DETAIL OF 45kV POLYMER TIE TOP	JNM	PRH	JJM
0	6-30-93	CONVERTED TO CAD DRAWING	ARR	EMH	RJS

ORIGINATOR: ARR

DRAWN BY: EMH

DATE: 6-30-93

APPROVED: R. J. SALESKY
DIRECTOR, DISTRIBUTION ENGINEERING
AND OPERATIONS SERVICES

NO SCALE

E-5.0.0

POST INSULATOR CONSTRUCTION EQUIPMENT & DIMENSIONS

E-5.0.0

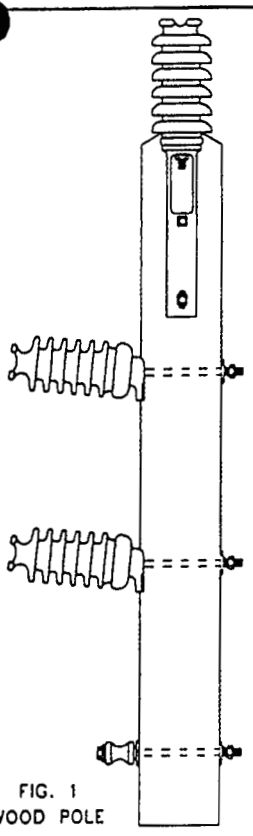
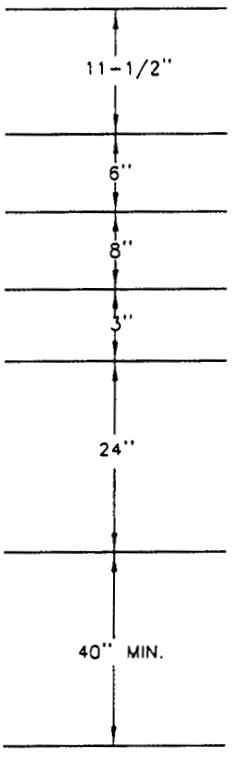


FIG. 1
WOOD POLE



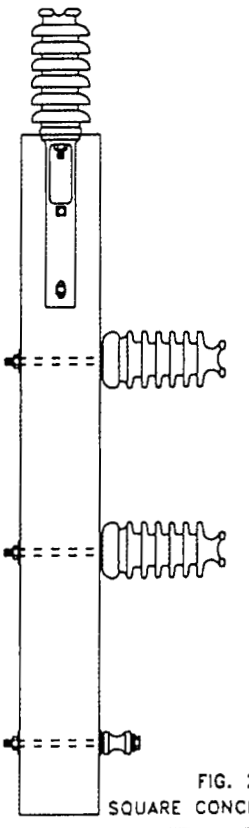


FIG. 2
SQUARE CONCRETE POLE

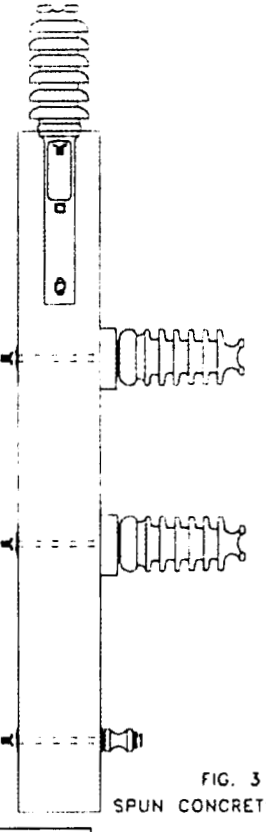
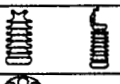


FIG. 3
SPUN CONCRETE POLE

ITEM	MATERIAL DESCRIPTION	M&S #
	TIE TOP OR SIDE CLAMP TYPE (AS REQUIRED)	131-11600-9 (13 KV AND 23 KV AREAS) 131-11650-5 (13 KV AND 23 KV AREAS) 131-11750-1 (23 KV SALT SPRAY)
	ADAPTER TO MOUNT INSULATORS TO WOOD POLES	140-040-010
	STUD BOLTS FOR MOUNTING INSULATORS (AS REQUIRED)	3/4" x 1-3/4" 143-09800-1 3/4" x 10" 143-10202-4 3/4" x 12" 143-10200-8 3/4" x 14" 143-10201-6 3/4" x 20" 143-10204-1 3/4" x 24" 143-10203-2 3/4" x 28" 143-10205-9
	SPOOL	144-405-004
	POLE TOP PIN BRACKET	141-248-005
	C-CHANNEL ADAPTER TO MOUNT INSULATOR TO SPUN CONCRETE POLES	140-040-050

NOTES:

1. VERTICAL SEPARATION BETWEEN PRIMARY CONDUCTORS AT POLES IS TO BE 36" MINIMUM IF AN ADJACENT POLE IS FRAMED HORIZONTAL OR TRIANGULAR.
2. PRIMARY TO NEUTRAL SEPARATION AT POLE IS DETERMINED BY MINIMUM MIDSPAN SEPARATION (DERM 4.4.1) IN NO CASE SHALL SEPARATION AT THE POLE BE LESS THAN 40" FOR WOOD AND CONCRETE POLES. FOR TYPICAL SEPARATIONS FOR VARIOUS SPAN DISTANCES REFER TO DERM 4.4.6

SPUN POLE INSULATOR ADAPTER MUST BE MOUNTED WITH THE [illegible] FACING AWAY FROM POLE

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

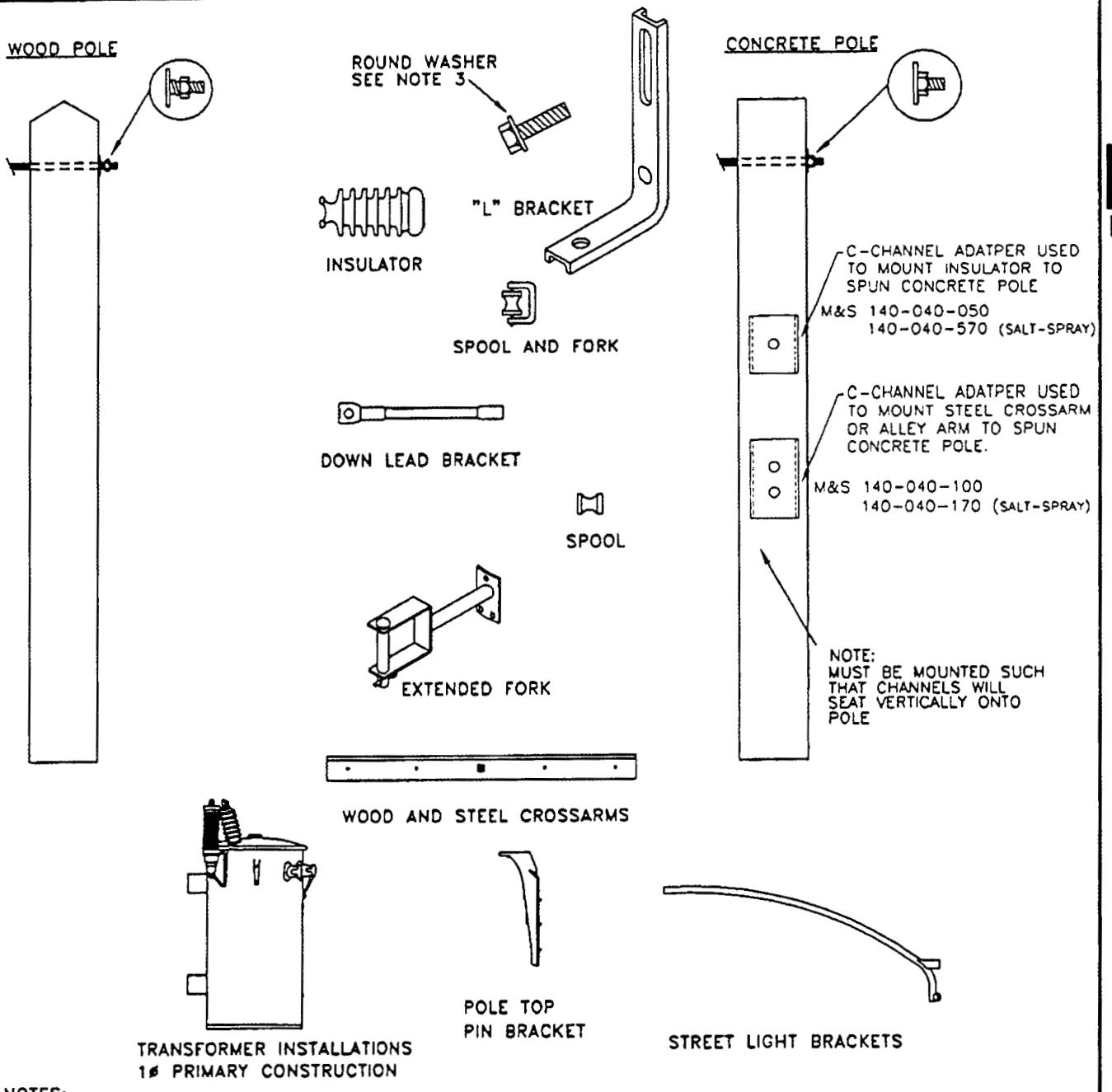
NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
2	8/02/01	UPDATE DRAWING (REVISE NOTE 2)	JNM	JES	JNM
1	6/30/93	REV DWG TO VERTICAL FRAMING STANDARD	ARR	MM	RJS

ORIGINATOR: ARR
DRAWN BY: JRF
DATE: 1/1/90
APPROVED: R.K. CIELO
DIRECTOR, DISTRIBUTION ENGINEERING AND SERVICE PLANNING
NO SCALE

E-5.0.2

INSTALLATION OF HARDWARE ON WOOD AND CONCRETE POLES

E-5.0.2



NOTES:

1. WHEN INSTALLING HARDWARE ON CONCRETE POLES, SPRING LOCKWASHERS ARE NOT REQUIRED.
2. USE DOUBLE COIL SPRING LOCKWASHER ON BOLTED ATTACHMENTS ON WOOD POLES.
3. USE 1 ROUND WASHER (M&S 145-3600-4) FOR 5/8" BOLT IN SLOT ONLY. WASHER NOT REQUIRED FOR 3/4" BOLT OR 5/8" BOLT IN BOTTOM HOLE.

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
3	1/25/07	UPDATE C-CHANNEL NOTE	CAP	ELS	JJM
2	12/5/06	UPDATE DWG TO ADD SPUN CONCRETE POLE	LFV	ELS	JJM
1	5/23/03	REVISE L BRACKET & ADD 5/8" BOLT	JNM	ELS	JJM

ORIGINATOR: ARR

DRAWN BY: FRAGA

DATE: 6/30/93

APPROVED: R. J. SALESKY
DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

NO SCALE

E-5.7.1

SLACK SPAN CONSTRUCTION VERTICAL FRAMING

E-5.7.1

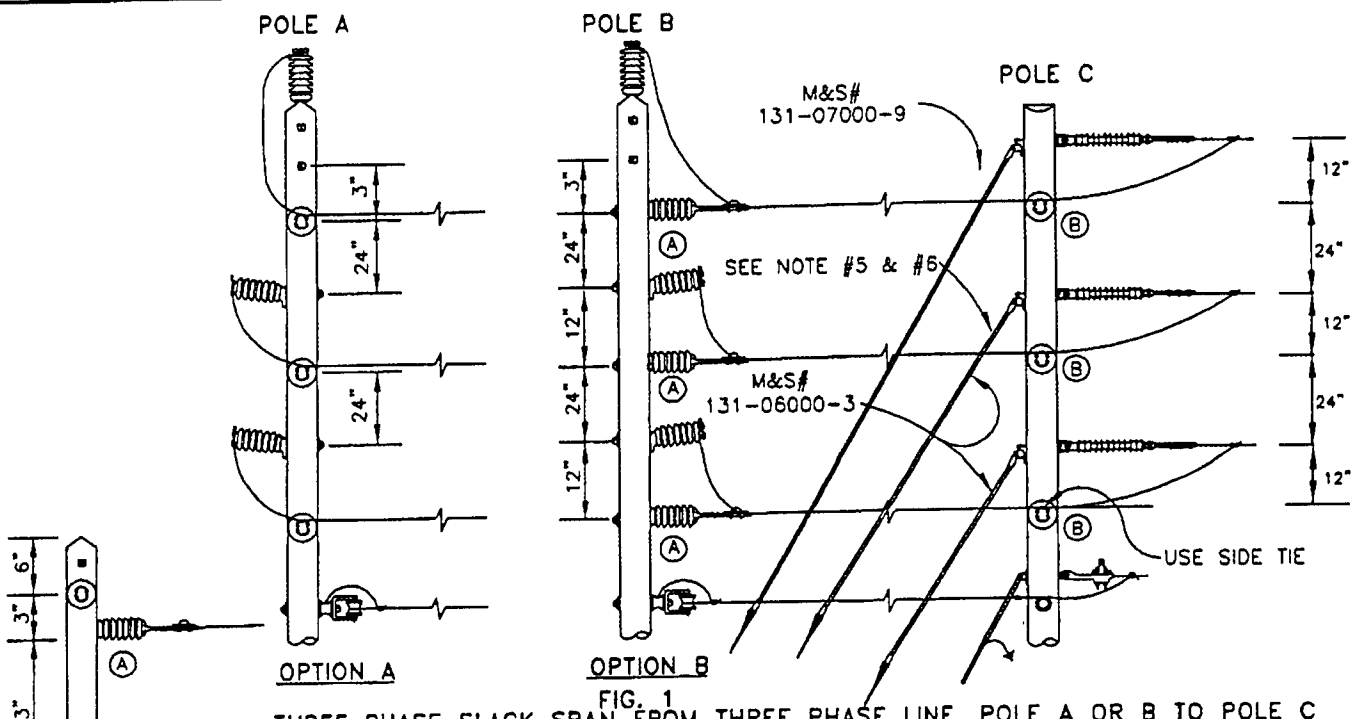


FIG. 1
THREE PHASE SLACK SPAN FROM THREE PHASE LINE, POLE A OR B TO POLE C

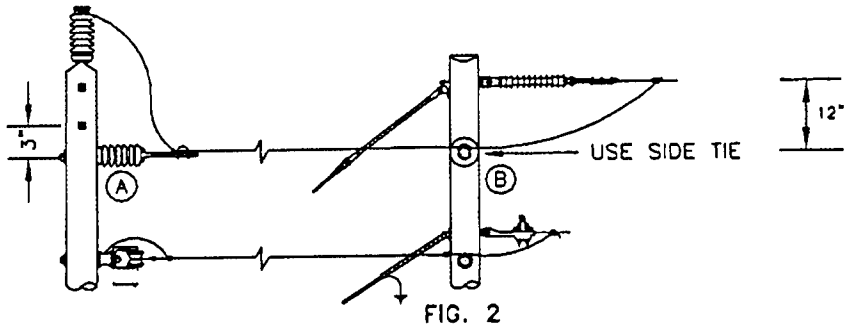


FIG. 2
SINGLE PHASE SLACK SPAN FROM SINGLE PHASE LINE

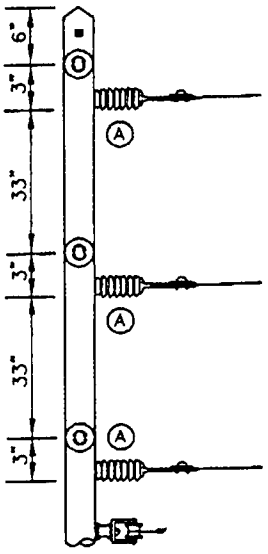


FIG. 3
THREE PHASE SLACK SPAN FROM 3ø DEADEND

SLACK SPAN		
CONDUCTOR	MAXIMUM LENGTH	INITIAL SAG
568.3 ACAR	50'	3'-7"
3/0 AAAC	75'	2'-9"
1/0 AAAC	95'	2'-10"

(A) LINE POST, CLAMP TOP INS
(B) LINE POST, VERTICAL TIE TOP, MOUNTED HORIZONTALLY WITH FORMED TIE WIRE.

NOTES:

1. ENGINEER TO SPECIFY SLACK SPAN SAG. (SEE DERM 4.4.5, 4.4.10)
2. INSTALL INSULATOR AND CLAMP AS SHOWN IN DETAIL "A" SUCH THAT WEIGHT ON OUTER END OF CLAMP WOULD TIGHTEN RATHER THAN LOOSEN BOLT.
3. ANY INSULATORS USED AS SLACK SPAN INSULATORS MUST HAVE LONG TRUNNION BOLTS.
4. FOR PULL-OFFS INSTALL FUSE SWITCHES ON NEXT POLE.
5. SEE D-2.0.0 FOR GUYING INSTRUCTIONS AND FOR PROPER ARRESTER STATION SPACING SEE DERM 2.9.1
6. FIBERGLASS GUY INSULATORS (FGI'S) MUST EXTEND BEYOND LOWEST CONDUCTOR. FOR SLACK SPAN, FGI'S ARE REQUIRED ON BOTH WOOD AND CONCRETE POLES.
7. USE CLASS 2 POLE MINIMUM

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
5	1/23/07	ADD TABLE, NOTE 7 & REV NOTE 6	JNM	ELS	JJM
4	7/1/03	EXTEND FGI PAST ENERGIZED CONDUCTOR ADD FIG 3	JNM	ELS	JJM
3	03/22/02	ADD DIMENSIONS FIGURE 1 & 2	JNM	JES	JJM
2	08/03/01	UPDATED DRAWING (ADDED NOTE #6)	JNM	JES	JJM
1	08/09/96	CHANGED PORCELAIN SUSPENSION INSULATORS TO POLYMER AND ADDED DEAD END CLAMP	PMG	RAS	JJM

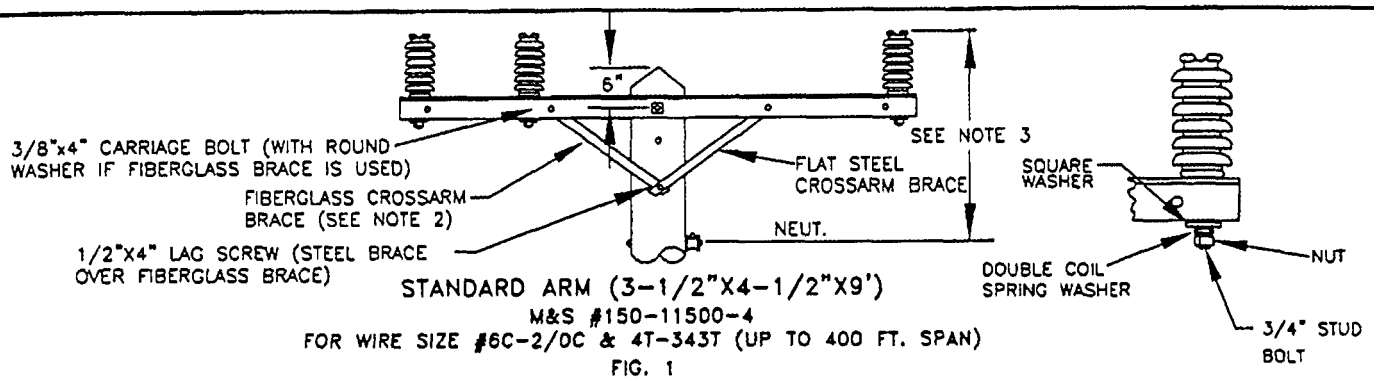
FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: PMG
DRAWN BY: RAS
DATE: 9/30/94
APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES
NO SCALE

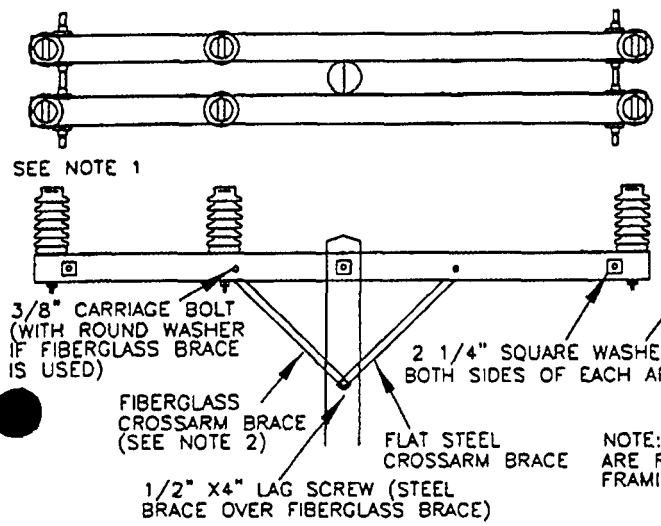
E-6.0.0

TANGENT CONSTRUCTION WOOD CROSSARM

E-6.0.0

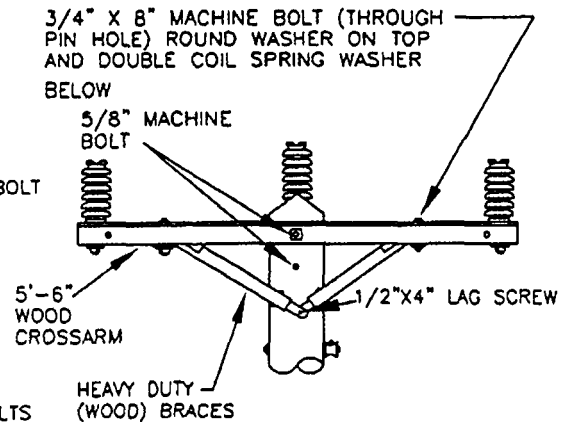


STANDARD ARM (3-1/2"X4-1/2"X9')
M&S #150-11500-4
FOR WIRE SIZE #6C-2/0C & 4T-343T (UP TO 400 FT. SPAN)
FIG. 1



NOTE: ADDITIONAL DA BOLTS ARE REQUIRED BASED ON FRAMING - SEE E-7.0.0

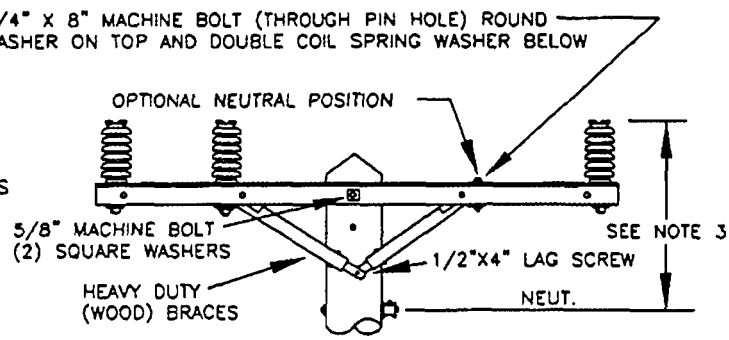
DOUBLE ARM
FIG. 2



SHORT STANDARD ARM
(3-1/2" x 4-1/2" x 5'-6")
M&S #150-11400-8
FIG. 4

NOTES:

1. ALL POST INSULATORS SHOWN ARE 35KV TIE TOP. USE CLAMP TOPS WHERE INDICATED BY ANGLE AND SIDE PULL LIMITATIONS SHOWN ON E-4.0.1 THRU E-4.0.3. USE 45KV POST INSULATORS (CLAMP TYPE) ON 23KV CIRCUITS IN SALT CONTAMINATION AREAS. USE 45KV POST TIE TOP POLYMER INSULATORS ON 23KV CIRCUITS IN SEVERE SALT CONTAMINATED AREAS.
2. FIBERGLASS BRACE IS NOT REQUIRED IN SALT SPRAY AREAS WHERE HARDWARE IS BONDED.
3. PRIMARY TO NEUTRAL SEPARATION AT POLE IS DETERMINED BY MINIMUM MIDSPAN SEPARATION (DERM 4.4.1), IN NO CASE SHALL SEPARATION AT THE POLE BE LESS THAN 40" FOR WOOD POLES OR CONCRETE POLES.
4. WHEN INSTALLING AN 8'-6" STEEL CROSSARM (M&S 141-512-004) ON A WOOD POLE, USE HEAVY DUTY WOOD BRACES (M&S 141-084-002).



HEAVY DUTY ARM (4-1/4"X5-1/4"X9')
M&S #150-11600-1
FOR WIRE SIZE 343T (MORE THAN 400 FT. SPAN)
568T, 4/0C & 350C
FIG. 3

SEE NOTE 4

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
4	12/13/06	ADD NOTE 4	CAP	ELS	JJM
3	4/1/04	REVISE FIG. 2	JNM	ELS	JJM
2	8/29/03	ADD M&S NUMBERS	JNM	ELS	JJM
1	8/04/01	UPDATE DRAWING (GENERAL TEXT REVISION)	JNM	JES	JJM
0	9/7/99	ADD REF TO 45KV POLYMER INSULATORS	JM	DLW	JJM
	8/9/96	ADDED FIGURE 4	PMG	RAS	JJM

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: PMG

DRAWN BY: RAS

DATE: 8/9/96

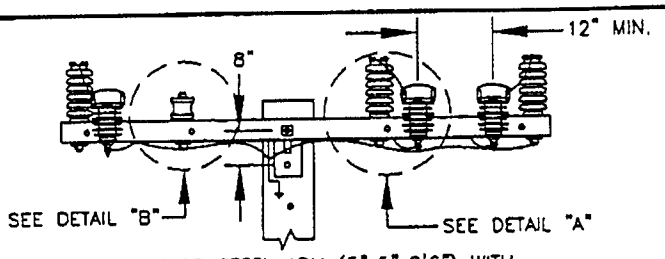
APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

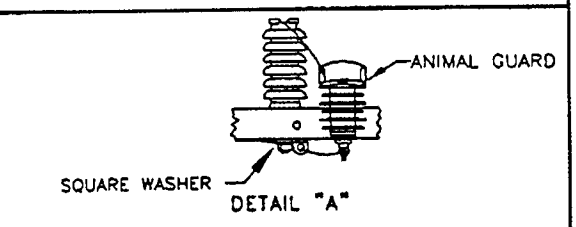
E-6.0.1

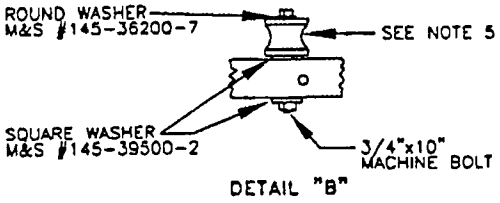
TANGENT CONSTRUCTION STEEL CROSSARM

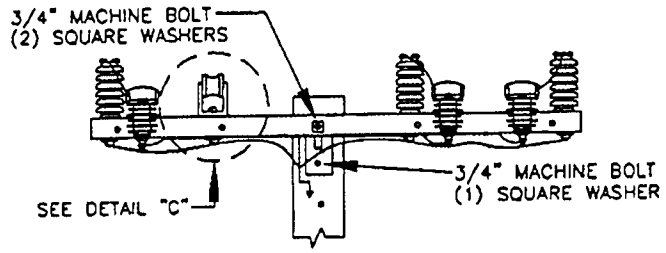
E-6.0.1



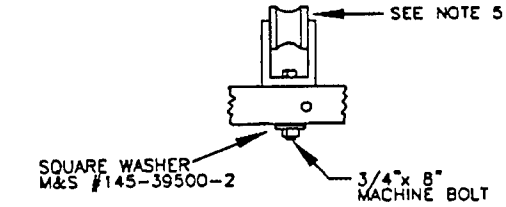
4 CONDUCTOR STEEL ARM (5"x5"x8'6") WITH
ALTERNATE ARRESTER INSTALLATION (SEE NOTE 6)
FIG. 4A

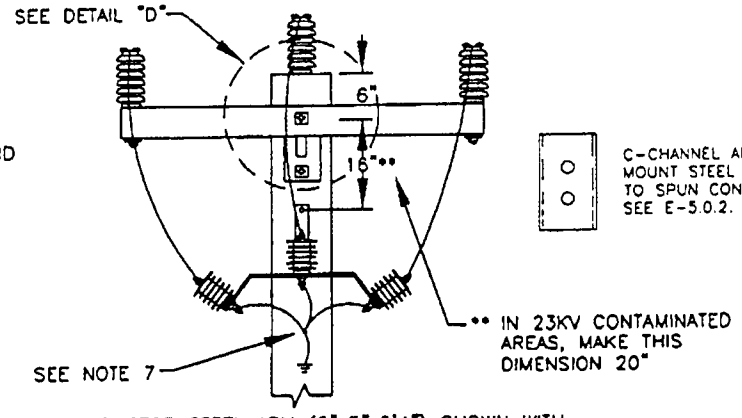






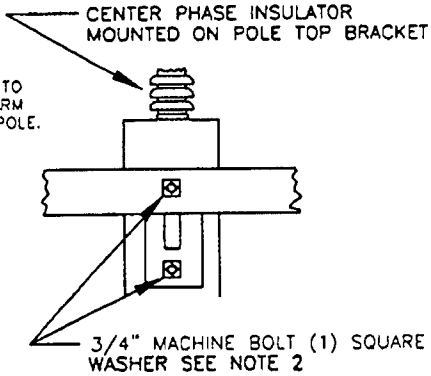
4 CONDUCTOR STEEL ARM (5"x5"x8'6") WITH
ALTERNATE ARRESTER INSTALLATION (SEE NOTE 6)
FIG. 4B





C-CHANNEL ADAPTER TO MOUNT STEEL CROSSARM TO SPUN CONCRETE POLE. SEE E-5.0.2.

3 CONDUCTOR STEEL ARM (5"x5"x5'4") SHOWN WITH
PREFERRED ARRESTER INSTALLATION
FIG. 5



NOTES:

1. ALL POST INSULATORS SHOWN ARE 35 KV TIE TOP. USE CLAMP TOPS WHERE INDICATED BY ANGLE AND SIDE PULL LIMITATIONS SHOWN ON E-4. USE 45 KV POST INSULATORS (CLAMP TYPE) ON 23 KV CIRCUITS IN SALT CONTAMINATION AREAS. INSULATORS ON 23KV CIRCUITS IN SEVERE SALT CONTAMINATED AREAS.
2. WHEN INSTALLING A STEEL ARM OPPOSITE A POLE TOP BRACKET, A LARGER POLE TOP BRACKET, M&S 141-248-007, SHOULD BE USED THAT ACCEPTS 3/4" BOLTS. THIS WOULD APPLY TO TANGENT, ANGLE, OR DOUBLE DEADEND CONSTRUCTION.
3. PRIMARY TO NEUTRAL SEPARATION AT POLE IS DETERMINED BY MINIMUM MIDSPAN SEPARATION (DERM 4.4.1), IN NO CASE SHALL SEPARATION AT THE POLE BE LESS THAN 40" FOR CONCRETE POLES OR WOOD POLES.
4. STEEL ARMS MUST BE SOLIDLY GROUNDED WHEN INSTALLED ON CONCRETE POLES.
5. IF THE NEUTRAL IS INSTALLED ON THE CROSSARM AND AN ARRESTER STATION IS REQUIRED ON THE POLE, THE ARRESTERS MUST BE INSTALLED ON THE ARM. OTHERWISE, ARRESTERS MAY BE INSTALLED AS SHOWN IN FIG. 5. WHEN ARRESTERS ARE INSTALLED ON THE ARM USE LUG CONNECTORS M&S #120-95000-2 OR 120-96000-8 TO SECURE GROUND LEADS.
6. IF NEUTRAL IS INSTALLED ON THE CROSSARM AT AN ANGLE USE FIG. 4A AS A FRAMING STANDARD. USE FIG 4B IF NO ANGLE IS PRESENT.
7. EACH ARRESTER GROUND LEAD SHOULD BE INDIVIDUALLY ATTACHED TO POLE BOND.

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
6	1/25/07	ADD C-CHANNEL DWG & NOTE	GAP	ELS	JJM
5	11/27/06	SHIFT CROSSARM & BRACKET DOWN ON FIG 5 AND DETAIL	GAP	ELS	JJM
4	10/11/04	ADD ANIMAL GUARD	LFV	ELS	JJM
3	6/18/03	UPDATE DRAWING (NOTES)	LFV	ELS	JJM
2	9/7/99	ADD BOND WIRE UNDER CROSSARM	JM	DLW	JJM
1	9/7/99	ADD REF TO 45KV POLYMER INSULATORS	JM	DLW	JJM
0	9/30/94	ORIGINAL DRAWING	ARR	RAS	RJS

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: ARR

DRAWN BY: RAS

DATE: 9/30/94

APPROVED: R. J. SALESKY
DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

NO SCALE

E-8.0.0

ANGLE CONSTRUCTION
CONCRETE POLE-STEEL CROSSARM

E-8.0.0

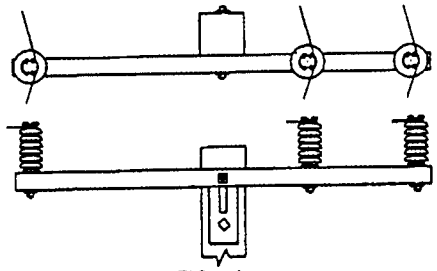
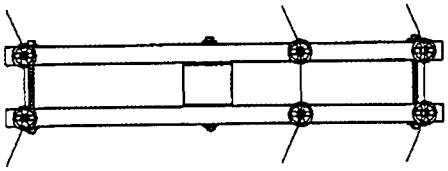


FIG. 1
8'6" STEEL ARM, ANGLE TO 5 DEGREES, SINGLE ARM



OVER 5 DEGREES USE CLAMP TOPS AND APPROPRIATE CLAMP

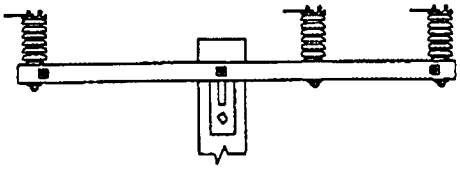


FIG. 2
8'6" STEEL ARM
MEDIUM ANGLES, MAX 45 DEGREES
DOUBLE ARM

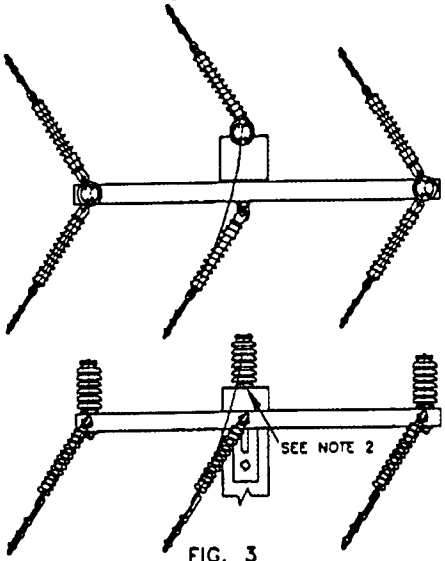


FIG. 3
5'4" STEEL ARM, 2 OR 3 CONDUCTORS, LARGE ANGLES, MAXIMUM 60 DEGREES

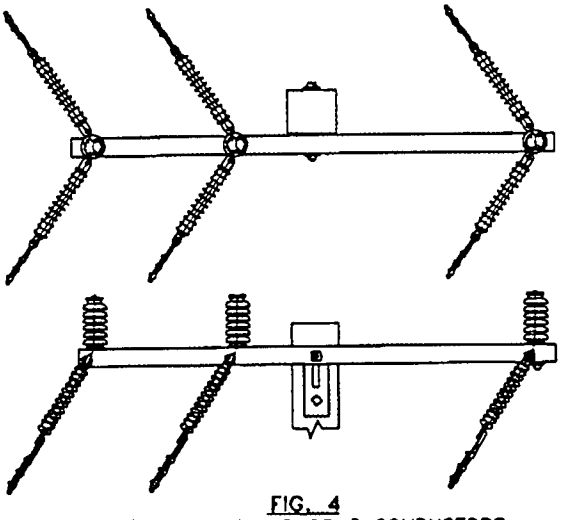


FIG. 4
8'6" STEEL ARM, 2 OR 3 CONDUCTORS, LARGE ANGLES, MAXIMUM 60 DEGREES

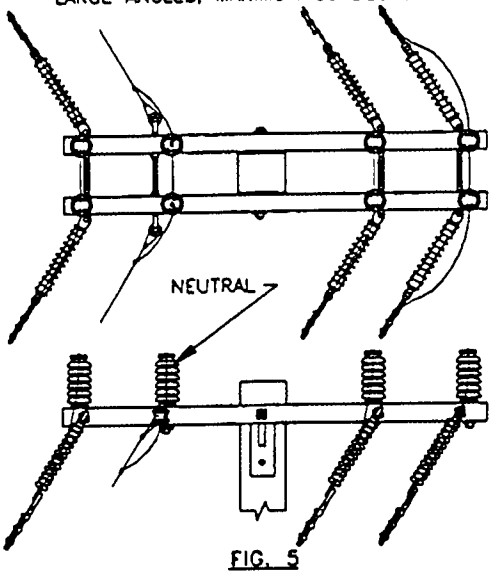


FIG. 5
8'6" STEEL ARM, 4 CONDUCTORS, LARGE ANGLES, MAXIMUM 60 DEGREES

NOTES:

1. ALL POST INSULATORS SHOWN ARE 35 KV. USE 45 KV POST INSULATORS AND 4 JD'S OR ONE POLYMER SUSPENSION INSULATOR ON 23KV CIRCUITS IN SALT CONTAMINATED AREAS. USE 45KV POST TIE TOP POLYMER INSULATORS ON 23KV CIRCUITS IN SEVERE SALT CONTAMINATED AREAS.
2. WHEN INSTALLING A STEEL ARM OPPOSITE A POLE TOP BRACKET, SEE E-6.0.1 FIG 5.
3. STEEL CROSSARMS ARE NOT RECOMMENDED FOR ANGLE CONSTRUCTION ON WOOD POLES.
4. FOR JUMPER SIZE SEE F-6.0.2.
5. FOR SPUN CONCRETE POLE INSTALLATIONS, USE THE C-CHANNEL ADAPTER SHOWN IN E-6.0.1.

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
3	1/25/07	ADD NOTE 5	GAP	ELS	JJM
2	10/27/06	UPDATE NOTE 2	GAP	ELS	JJM
1	9/7/99	ADD REF TO 45KV POLYMER INSULATORS	JM	DLW	JJM
0	8/9/96	CHANGED PORCELAIN SUSPENSION INSULATORS TO POLYMER	PMG	RAS	JJM

ORIGINATOR: PMG
DRAWN BY: RAS
DATE: 8/9/96
APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES
NO SCALE

E-29.0.0

SLACK SPAN CONSTRUCTION

E-29.0.0

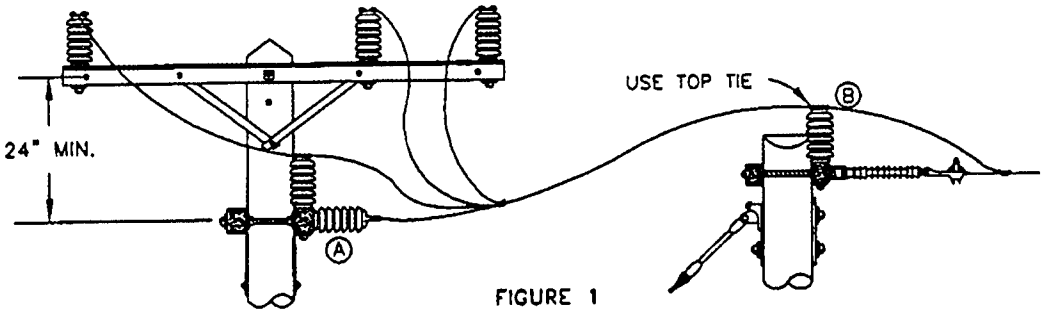


FIGURE 1
THREE PHASE SLACK SPAN FROM THREE PHASE LINE

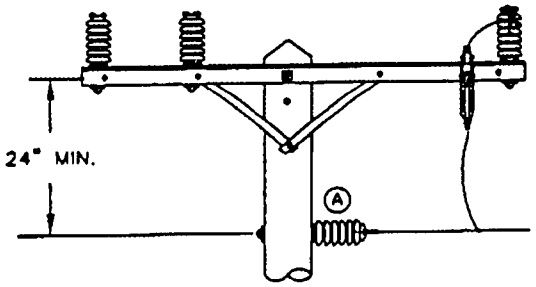


FIGURE 2
SINGLE PHASE SLACK SPAN
FROM THREE PHASE LINE

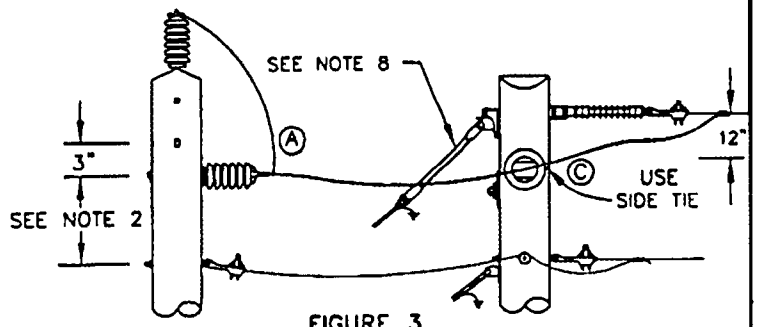


FIGURE 3
SINGLE PHASE SLACK SPAN
FROM SINGLE PHASE LINE

SLACK SPAN		
CONDUCTOR	MAXIMUM LENGTH	INITIAL SAG
568.3 ACAR	50'	3'-7"
3/0 AAAC	75'	2'-9"
1/0 AAAC	95'	2'-10"

(A) LINE POST, CLAMP TOP INSULATOR
(B) LINE POST, VERTICAL TIE-TOP, WITH FORMED TIE WIRE.
(C) LINE POST, VERTICAL TIE TOP, MOUNTED HORIZONTALLY WITH FORMED TIE WIRE.

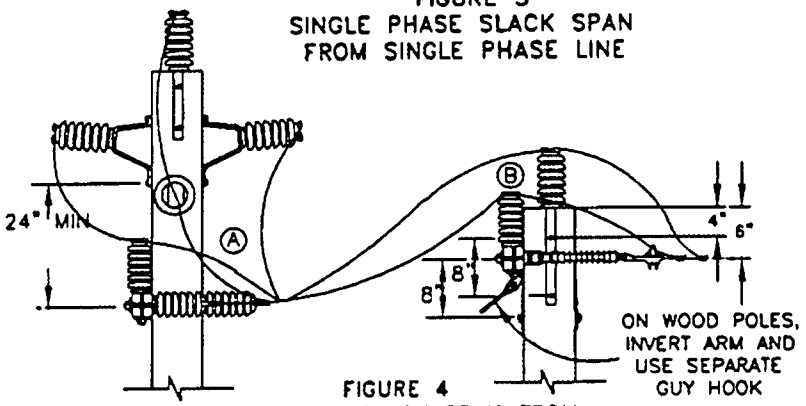


FIGURE 4
THREE PHASE SLACK SPAN FROM
THREE PHASE LINE USING STEEL CROSSARM
(FOR MAINTENANCE ONLY)

NOTES:

1. ALL POST INSULATORS SHOWN ARE 35 kV TIE TOP OR CLAMP TOP. USE 45 kV POST INSULATORS ON 23 kV CIRCUITS IN SALT CONTAMINATED AREAS. USE 45KV POST TIE TOP POLYMER INSULATORS ON 23KV CIRCUITS IN SEVERE SALT CONTAMINATED AREAS.
2. PRIMARY TO NEUTRAL SEPARATION AT POLE IS DETERMINED BY MINIMUM MIDSPAN SEPARATION (DERM 4.4.1). IN NO CASE SHALL SEPARATION AT THE POLE BE LESS THAN 40" FOR WOOD OR CONCRETE POLES.
3. BASE OF INSULATOR MUST BE INSTALLED TIGHTLY AGAINST CROSSARM OR POLE
4. ENGINEER TO SPECIFY SLACK SPAN SAG. (SEE DERM 4.4.5, 4.4.10).
5. INSTALL INSULATOR AND CLAMP AS SHOWN IN DETAIL "A" SUCH THAT WEIGHT ON OUTER END OF CLAMP WOULD TIGHTEN RATHER THAN LOOSEN BOLT.
6. ANY INSULATORS USED AS SLACK SPAN INSULATORS MUST HAVE LONG TRUNNION BOLTS WITH LOCKNUT.
7. FOR JUMPER SIZE INFORMATION SEE F-6.0.2.
8. FIBERGLASS GUY INSULATOR (FIGURE 1) MUST EXTEND BELOW LOWEST ENERGIZED CONDUCTOR, OR THE GUY MUST BE BONDED.
9. USE CLASS 2 POLE MINIMUM.

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
3	1/23/07	ADD TABLE, NOTE 9 & REV NOTE 8	JNM	ELS	JJM
2	03/22/02	ADD DIMENSIONS TO FIGURE 3.	JNM	JES	JJM
1	09/08/99	INSULATORS TO POLYMER	JNM	DLW	JJM
0	08/09/96	CHANGED PORCELAIN SUSPENSION INSULATORS TO POLYMER	PMG	RAS	JJM

ORIGINATOR: PMG
DRAWN BY: RAS
DATE: 8/9/96
APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES
NO SCALE

E-29.1.0

SLACK SPAN CONSTRUCTION
CONCRETE POLE INSTALLATION ONLY

E-29.1.0

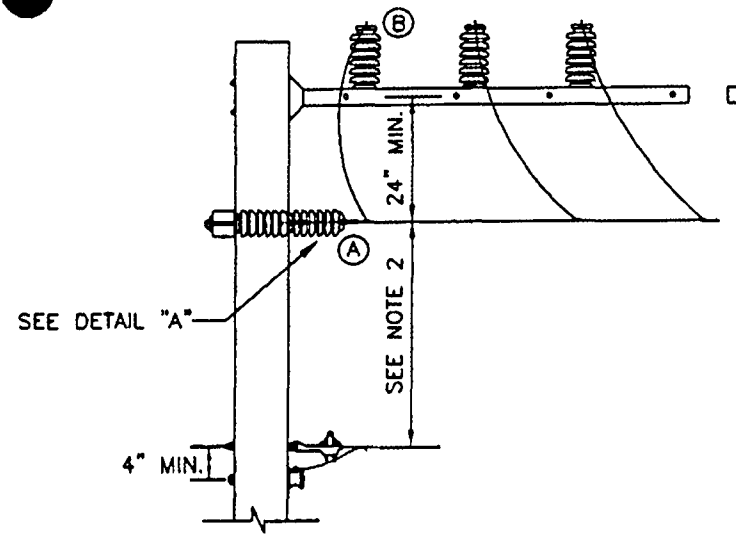


FIGURE 1

3ø 102" STEEL ARM DEAD END OFF 3ø TANGENT ALLEY ARM

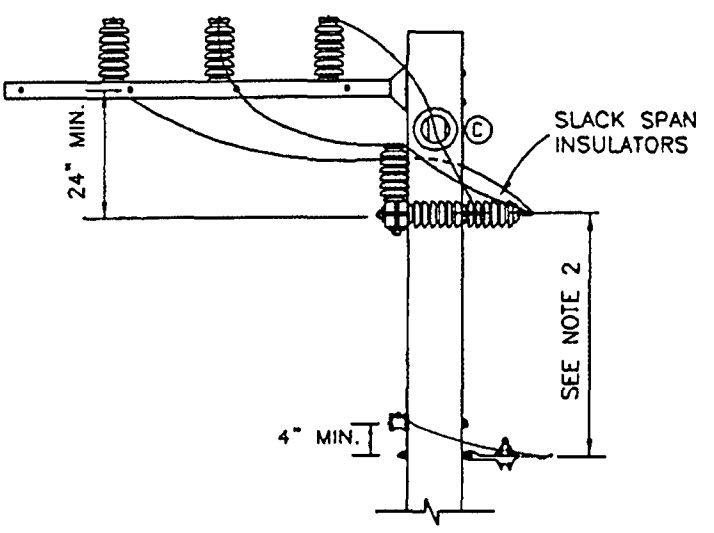


FIGURE 2

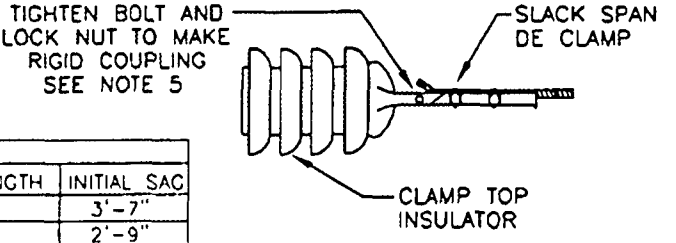
3ø 102" STEEL ARM DEAD END OFF 3ø TANGENT ARM

Ⓐ LINE POST, CLAMP TOP INS

Ⓑ LINE POST, VERTICAL TIE-TOP, WITH FORMED TIE WIRE.

Ⓒ LINE POST, VERTICAL TIE TOP, MOUNTED HORIZONTALLY WITH FORMED TIE WIRE.

SLACK SPAN		
CONDUCTOR	MAXIMUM LENGTH	INITIAL SAG
568.3 ACAR	50'	3'-7"
3/0 AAAC	75'	2'-9"
1/0 AAAC	95'	2'-10"



DETAIL "A"

NOTES:

1. ALL POST INSULATORS SHOWN ARE 35 kV TIE TOP OR CLAMP TOP. USE 45 kV POST INSULATORS ON 25 kV CIRCUITS IN SALT CONTAMINATED AREAS. USE 45KV POST TIE TOP POLYMER INSULATORS ON 23KV CIRCUITS IN SEVERE SALT CONTAMINATED AREAS.
2. PRIMARY TO NEUTRAL SEPARATION AT POLE IS DETERMINED BY MINIMUM MIDSPAN SEPARATION (DERM 4.4.1) IN NO CASE SHALL SEPARATION AT THE POLE BE LESS THAN 40" FOR WOOD OR CONCRETE POLES.
3. BASE OF INSULATOR MUST BE INSTALLED TIGHTLY AGAINST CROSSARM OR POLE.
4. ENGINEER TO SPECIFY SLACK SPAN SAG. (SEE DERM 4.4.5, 4.4.10).
5. INSTALL INSULATOR AND CLAMP AS SHOWN IN DETAIL "A" SUCH THAT WEIGHT ON OUTER END OF CLAMP WOULD TIGHTEN RATHER THAN LOOSEN BOLT.
6. ANY INSULATORS USED AS SLACK SPAN INSULATORS MUST HAVE LONG TRUNNION BOLTS.
7. FOR JUMPER SIZE INFORMATION SEE F-6.0.2.

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
2	1/23/07	ADD TABLE	JNM	ELS	JJM
1	9/8/99	ADD REF TO 45KV POLYMER INSULATORS	JM	DLW	JJM
0	9/30/94	REVISED FIG 1 & 2 ADD BOLTED DEADEND CLAMP & NOTE 7	ARR	RAS	RJS

ORIGINATOR: ARR DRAWN BY: RAS

DATE: 9/30/94 APPROVED: R. J. SALESKY NO SCALE

DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

POLE GROUNDING

G-3.0.2

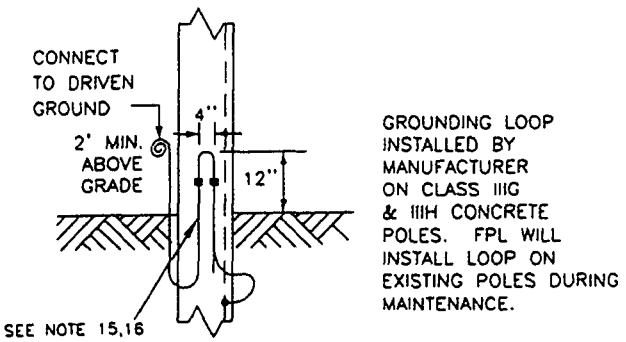


FIG. 3 CONCRETE POLE GROUNDING DETAIL

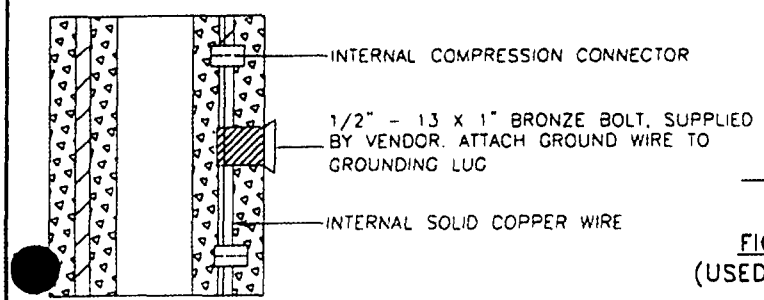


FIG. 5 SPUN CONCRETE POLE GROUNDING DETAIL

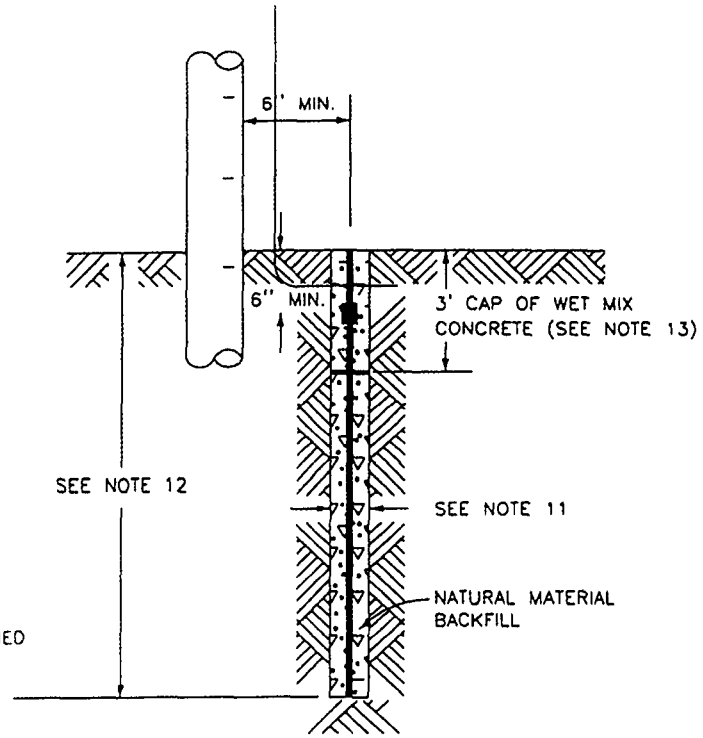


FIG. 4 DRILLING HOLE FOR GROUND ROD
(USED ONLY WHEN DRIVING ROD IS IMPOSSIBLE)

G

NOTES:

8. UNGROUNDED HARDWARE WITHIN 2" OF GROUND WIRE OR OTHER GROUNDED HARDWARE SHOULD BE BONDED TO IT EXCEPT WHERE SPECIAL INSTRUCTIONS ARE GIVEN TO ISOLATE THE SAME.
9. DRIVEN GROUND RODS, WHERE POSSIBLE, SHOULD BE LOCATED TO AVOID INTERFERENCE WITH POSSIBLE FUTURE POLE REPLACEMENTS.
10. FOR GROUNDING REQUIREMENTS OF STREET LIGHT POLES SEE H-II.0.0 AND H-II.1.0 .
11. HOLE DIAMETER DEPENDS ON AVAILABILITY OF DRILL EQUIPMENT, WITH MAXIMUM 4" DIAMETER.
12. HOLE DEPTH DEPENDS ON ROCK DEPTH. DRILL ONLY AS DEEP AS NECESSARY TO GET THROUGH ROCK LAYERS, AND DRIVE ROD TO ADDITIONAL DEPTH NECESSARY TO ACHIEVE SPECIFIED RESISTANCE (MAXIMUM DEPTH, 40').
13. A LESSER DEPTH FOR THE CONCRETE CAP IS PERMITTED ONLY IF TOP SOIL CONDITIONS IN THE SOUTH FLORIDA AREA DO NOT PERMIT A FULL 3 FT. DEPTH.
14. GROUND LOOP SHOULD BE EXTENDED IF REQUIRED TO MAINTAIN MIN. 12" ABOVE FINAL GRADE.
15. BOTTOM OF LOOP MUST REMAIN SEPARATED FOR TEST PURPOSES.
16. LOOP TO BE INSTALLED ON EXISTING CONCRETE POLES DURING MAINTENANCE IF POSSIBLE AND PRACTICAL.

SUPERSEDES G-3.0.2 LAST REVISED ON 3-15-91

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
2	1/23/07	ADDED FIG 5 FOR SPUN CONCRETE POLE	RJO	ELS	JJM
1	9/30/94	REVISIED MINIMUM GROUND DEPTH AND REMOVED OLD NOTE 14	JSB	MRB	RJS
0	3/15/91	ORIGINAL DRAWING	JSB	MRB	RJS

ORIGINATOR: JSB DRAWN BY: MRB

DATE: 3/15/91 APPROVED: R.J. SALESKY
DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

NO SCALE

H-4.0.0

STREET LIGHT POLE WEIGHTS AND SETTING DEPTHS

H-4.0.0

FIBERGLASS POLES				
LENGTH OF POLE AND FINISH	M&S NUMBER	APPROXIMATE WEIGHT	MINIMUM SETTING DEPTH IN EARTH	MINIMUM SETTING DEPTH IN ROCK
20' WITH NATURAL FINISH	154-119-004	38 lbs.	4' - 6"	4' - 0"
13' WITH SMOOTH FINISH	154-118-008	23 lbs.	3' - 0"	3' - 0"

STANDARD CONCRETE POLES				
LENGTH OF POLE AND TYPE	M&S NUMBER	APPROXIMATE WEIGHT	MINIMUM SETTING DEPTH IN EARTH	MINIMUM SETTING DEPTH IN ROCK
20' TYPE "O"	152-220-000	750 lbs.	4' - 6"	4' - 0"
35' TYPE "SU"	152-239-002	2,240 lbs.	7' - 6"	6' - 0"
35' TYPE "O"	152-225-001	2,240 lbs.	7' - 0"	6' - 0"
40' TYPE "IIIA"	152-351-007	4,674 lbs.	10' - 0"	8' - 0"
45' TYPE "IIIA"	152-352-003	4,924 lbs.	10' - 0"	8' - 6"
50' TYPE "IIIA"	152-353-000	5,324 lbs.	10' - 0"	8' - 6"

DECORATIVE CONCRETE POLES (SEE NOTE 1)				
LENGTH OF POLE AND TYPE	M&S NUMBER	APPROXIMATE WEIGHT	MINIMUM SETTING DEPTH IN EARTH	MINIMUM SETTING DEPTH IN ROCK
18' -6" WASHINGTON	152-230-005 152-231-508 152-231-605 152-231-700	970 lbs.	4' - 0"	4' - 0"
17" - 3" VICTORIAN	152-233-000 152-233-200 152-233-300	575 lbs.	4' - 3"	4' - 3"
37' OCTAGONAL	152-232-008	1,730 lbs.	7' - 0"	6' - 0"

NOTES:

1) THE USE OF A NYLON SLING IS REQUIRED FOR DECORATIVE CONCRETE POLES. THIS IS NECESSARY TO AVOID DAMAGING THE SURFACE OF POLES.
2) THE SETTING DEPTHS IN ROCK APPLY TO HOLES CONSISTING OF NOT LESS THAN 90% ROCK. THEY ARE ALSO APPLICABLE TO HOLES IN HARD CLAY.

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
3	1/9/07	UPDATE CHARTS	FLM	ELS	JJM
2	8/15/05	UPDATE CHARTS	SMS	ELS	JJM
1	6/29/05	UPDATE CHARTS	SMS	ELS	JJM
0	5/29/03	ORIGINAL DRAWING	SMS	ELS	JJM

ORIGINATOR: SMS

DRAWN BY: ELS

DATE: 5/29/03

APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

I-3.2.0

TRANSFORMER POLE WEIGHT LOADING

I-3.2.0

THE USUAL WIND-LOADING CALCULATIONS TO DETERMINE POLE CLASS REQUIREMENTS DO NOT CONSIDER PERMANENT LOAD SUCH AS A HEAVY TRANSFORMER. THIS TYPE OF LOAD CAN CAUSE A POLE TO BEND OR "BOW" OVER A PERIOD OF TIME, EVEN THOUGH CODE STRENGTH REQUIREMENTS ARE EXCEEDED BY A COMFORTABLE MARGIN. TO PREVENT THIS LONG-TERM DEFORMATION, THE TABLE AND CHART BELOW SHOULD BE USED TO DETERMINE THE MINIMUM CLASS OF POLE REQUIRED FOR A PARTICULAR TRANSFORMER WEIGHT. FOR INSTALLATION ON AN EXISTING POLE IN GOOD CONDITION, ONE CLASS SMALLER THAN INDICATED BELOW MAY BE USED.

WHERE LOAD GROWTH REQUIRING FUTURE TRANSFORMER REPLACEMENT CAN BE REASONABLY ANTICIPATED, A CLASS 3 POLE SHOULD BE THE MINIMUM SET FOR A TWO TRANSFORMER BANK.

IT WILL BE NOTED THAT AN OPEN DELTA BANK WILL, IN GENERAL, REQUIRE A LARGER POLE THAN CLOSED DELTA BANK. THIS IS CAUSED BY THE FACT THAT IN A CLOSED DELTA BANK THE TWO POWER TRANSFORMERS BALANCE EACH OTHER*, AND CAUSE NO UNBALANCED MOMENT - AND IT IS THIS UNBALANCED MOMENT, NOT THE WEIGHT IN ITSELF, WHICH INITIATES POLE BOWING.

NOTE, HOWEVER, THAT THE INFORMATION BELOW CANNOT BE CONSIDERED A SUBSTITUTE FOR WIND LOADING CALCULATIONS. WIND LOADING SHOULD BE CONSIDERED SEPARATELY, AND THE METHOD DICTATING THE LARGER POLE SHOULD PREVAIL.

*NOTE - THE CHART AND TABLE BELOW ASSUME THE USE OF CLUSTER-MOUNTS. FOR ARM MOUNTED BANKS, TOTAL THE TRANSFORMER WEIGHT AND USE THE TABLE AS IF ALL WEIGHT WERE CONCENTRATED IN ONE TRANSFORMER.

EXAMPLES:
a) ONE TRANSFORMER WEIGHING 1100 LB, REQUIRES A CLASS 4 POLE. (FROM TABLE)
b) THREE CLUSTER MOUNTED TRANSFORMERS EACH WEIGHING 1100 LB, REQUIRE A CLASS 4 POLE. (FROM TABLE)
c) ONE 1000 LB. AND ONE 400 LB. TRANSFORMER CLUSTER MOUNTED REQUIRES A CLASS 4 POLE. (EXAMPLE ON CHART)
d) THREE ARM MOUNTED TRANSFORMERS EACH WEIGHING 600lb, REQUIRE A CLASS 2 POLE. (1800lb. TOTAL FROM TABLE)

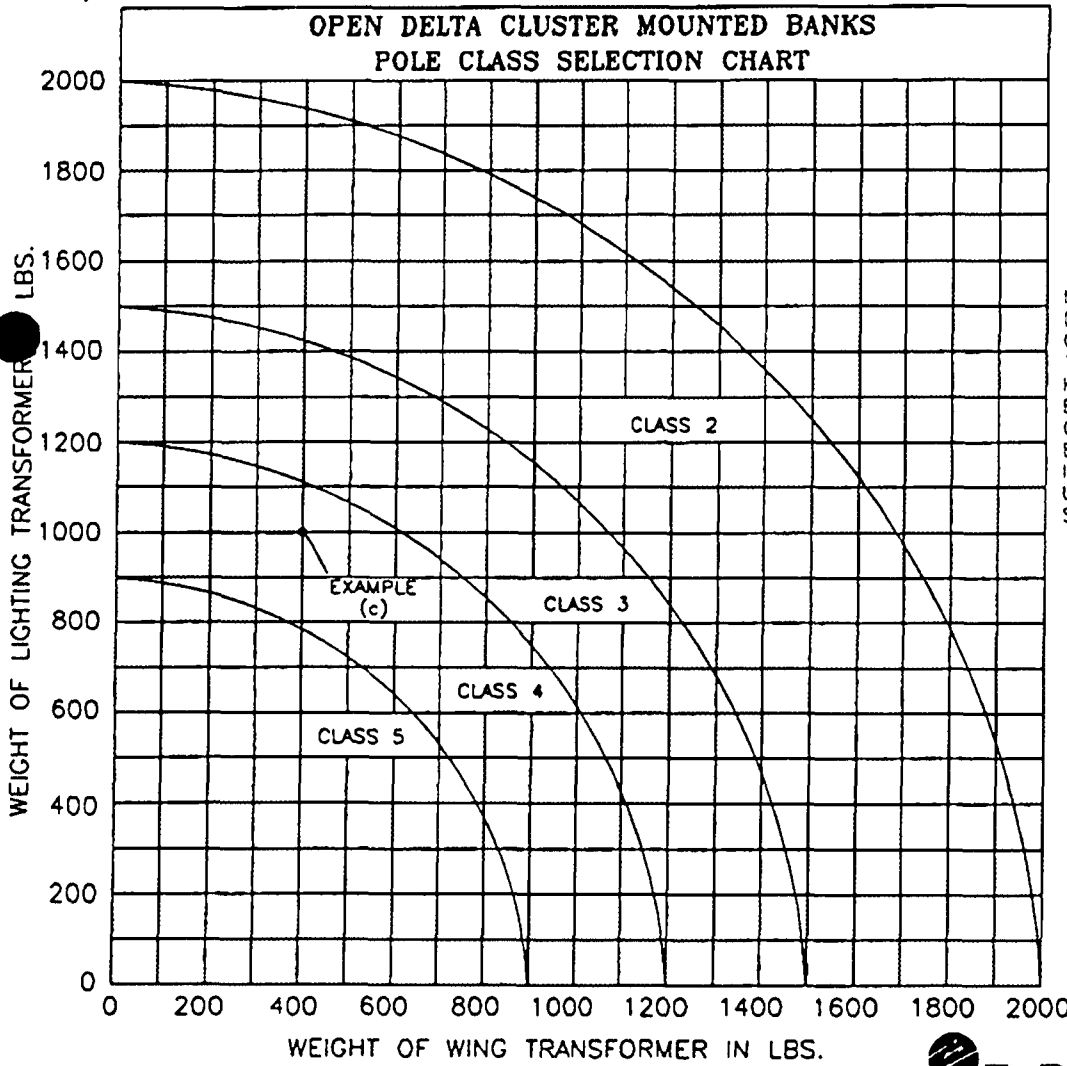


TABLE	
POLE CLASS	SINGLE TX. MAX. LBS.
5	900
4	1200
3	1500
2	2000

NOTE: STANDARD APPLIES TO OPEN DELTA CLUSTERS. ALL NEW CONSTRUCTION OR REPLACEMENT TRANSFORMER POLES WITH 3-100 KVA OR LARGER TRANSFORMERS TO BE TYPE III-H OR 4.7 KIP SPUN CONCRETE POLES AND ACCESSIBLE BY AERIAL EQUIPMENT. FOR INACCESSIBLE REPLACEMENT POLE USE A CLASS 2 WOOD POLE OR STRONGER.

F P L
OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
3	3/8/07	REMOVE REFERENCE TO 3 PHASE BANKS. INSERTED NOTE ON CONCRETE POLES.	RR	ELS	JRD
2	6/30/93	REVISE NOTES	ARR	JRG	RJS
1	1/29/92	ADDED CLASS 4 & 5 POLES	ARR	HO	RJS
0	1/29/92	ORIGINAL DRAWING	MLM	JRF	RKC

ORIGINATOR: MLM DRAWN BY: JRF

DATE: 3/15/91 APPROVED: R.K. CIELO
DIRECTOR, DISTRIBUTION ENGINEERING AND SERVICE PLANNING

NO SCALE

I-9.0.0 SINGLE PHASE STEPDOWN TRANSFORMER ON URD TERMINATOR POLE I-9.0.0

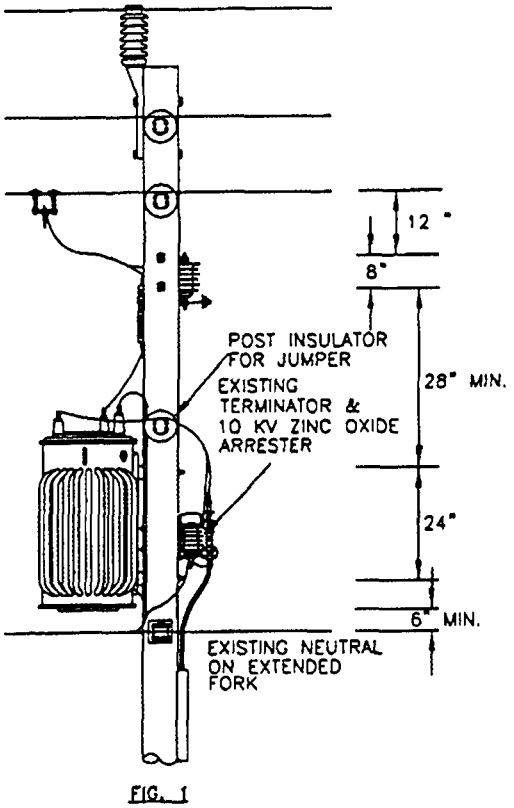


FIG. 1

TABLE 1

SIZE TX.	CONC. POLE TYPE REQ.	
	NEW	EXISTING
100 KVA	ALL TYPE III OR BETTER	
167 KVA		
333 KVA		
1000 KVA		

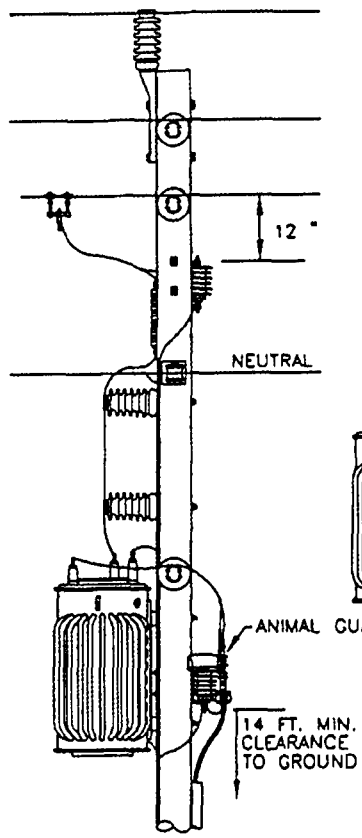


FIG. 2

ALTERNATE METHOD LOWERING TRANSFORMER AND TERMINATOR (SEE NOTE 2)

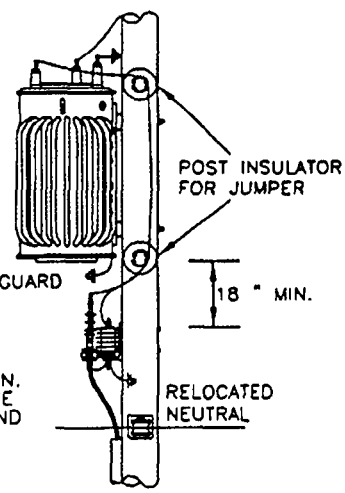


FIG. 3

ALTERNATE METHOD LOWERING TERMINATOR

NOTES:

1. FRAMED ACCORDING TO FIG. 1, AN EXISTING TERMINATOR/ARRESTER NEED NOT BE RELOCATED. IF CLIMBING SPACE IS A CONCERN (AND SPACE PERMITS), LOWER THE TERMINATOR AND INSTALL THE TRANSFOMER ABOVE IT. SEE FIG. 3.
2. AUTO TRANSFORMER IS SHOWN (H2 & X2 COMMON TO ONE BUSHING). ON TWO WINDING TRANSFORMER, TIE H2 & X2 TOGETHER, AND GROUND.
3. #6 COPPER IS ADEQUATE TO CARRY THE CURRENTS INVOLVED. BECAUSE OF ITS MECHANICAL STRENGTH, #4 COPPER (OR BETTER) SHOULD BE USED FOR PRIMARY AND NEUTRAL JUMPERS.
4. VERTICAL CONFIGURATION AND A 333 KVA TRANSFORMER ARE SHOWN AS TYPICAL. ALL POLE MOUNTED STEP UP/DOWN TRANSFORMERS SHOULD HAVE MOUNTING LUGS COVERED IN DETAILS ON SHEET I-3. AVOID USING CLUSTER MOUNTS IF POSSIBLE (KEEP IT CLOSE TO POLE).
5. UNLESS OTHERWISE DIRECTED, PROTECT THE STEP DOWN TRANSFORMER WITH THE FOLLOWING FUSE SIZES AS A MINIMUM: 100 KVA, 8 AMP KS; 167 KVA, 15 AMP KS; 333 KVA, 25 AMP KS; 1000 KVA, 80 AMP KS ALSO SEE DCS I-19.0.0 AND I-19.2.0.
6. WHEN USED FOR OVERHEAD TO OVERHEAD TRANSFORMATION, THE MINIMUM FUSE SIZE IS 15 AMPS KS.
7. REFER TO I-53.1.3 FOR TRANSFOMER CONNECTION DIAGRAM.

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
4	2/14/07	REMOVED WOOD POLE CLASS REQ., ENGINEERS NOTE & NOTE 2	RR	ELS	JRD
3	9/16/05	UPDATE NOTE #6	IA	ELS	JJM
2	10/15/04	ADD ANIMAL GUARD	LFV	ELS	JJM
1	6/30/93	REDRAWN FROM MANUAL- COMBINED I-9.0.1 & 1-9 SH. 2	MV	CB	RJS
0	3/1/89	ORIGINAL DRAWING	MV	CB	RJS

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: MV DRAWN BY: CB

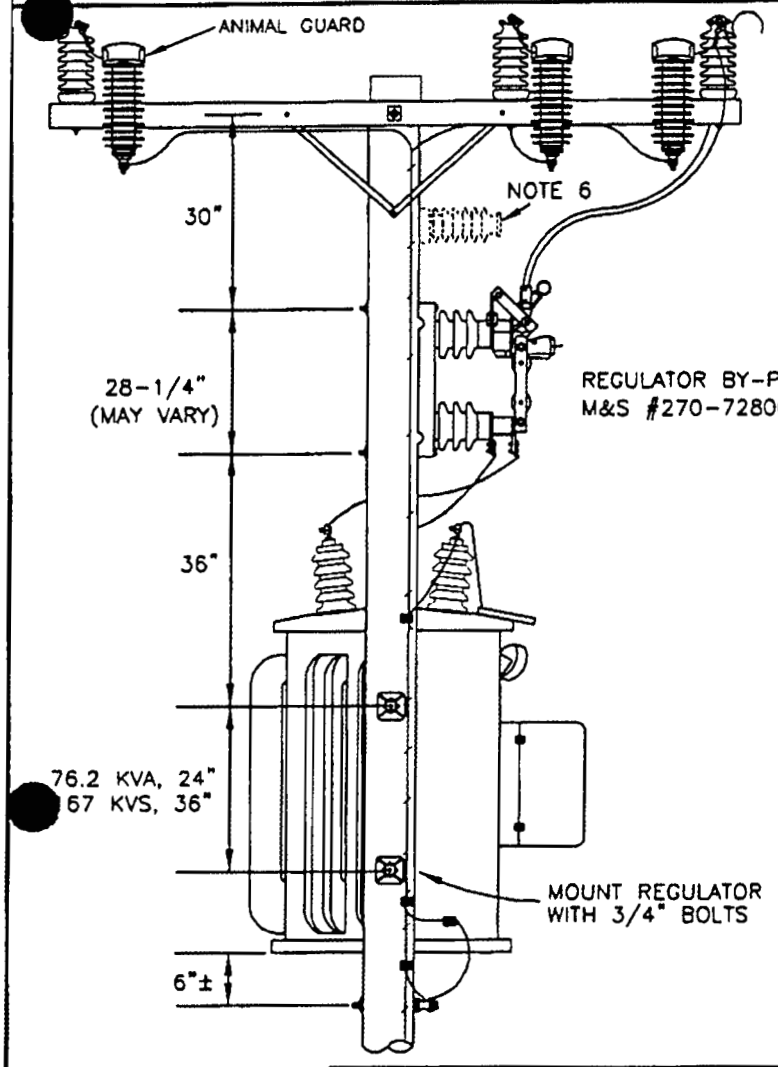
DATE: 6/30/93 APPROVED: R.J. SALESKY
DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

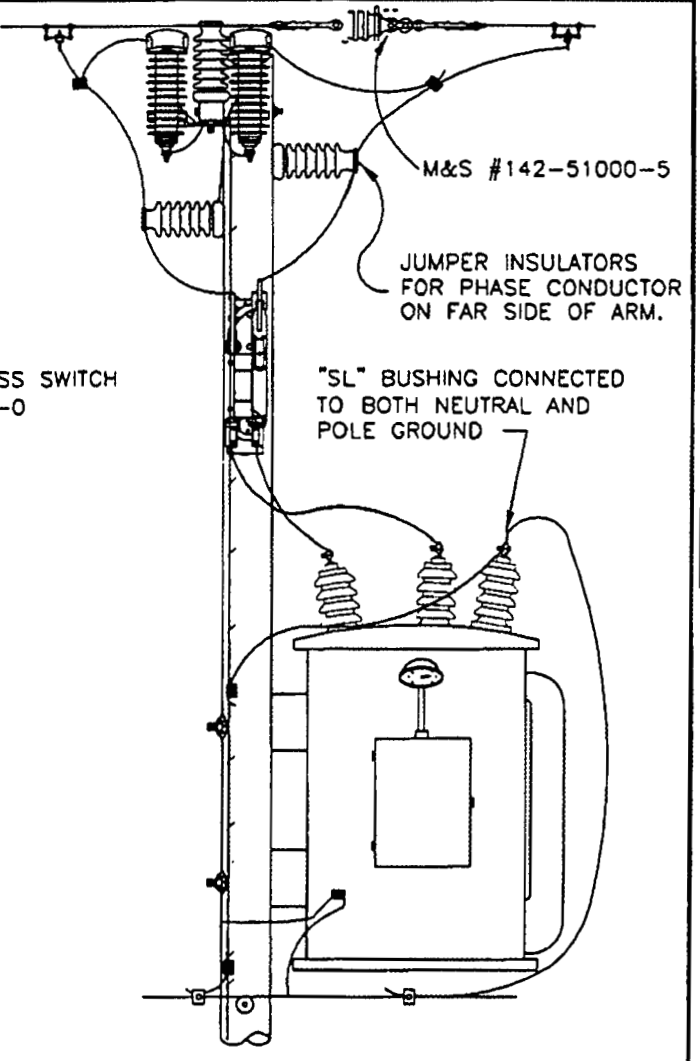
NO SCALE

I-10.0.0

SINGLE PHASE LINE REGULATOR INSTALLATION (ALTERNATE METHOD)

I-10.0.0





M&S NUMBER	REGULATOR KVA	CONC. POLE TYPE REQ.	
		NEW	EXISTING
327-070-004	76.2 (13 KV)	ALL TYPE III OR BETTER	
327-102-003	167 (13 KV)		
327-100-001	144 (23 KV)		
327-102-500	288 (23 KV)		

NOTES:

1. CROSSARM FRAMING SHOWN AS TYPICAL. MAY BE ADAPTED TO OTHER FRAMING AS REQUIRED.
2. ONE PHASE OF THREE PHASE INSTALLATION ARE ILLUSTRATED. INSTALL A, B, & C PHASE REGULATORS ON THREE ADJACENT POLES.
3. SOURCE AND LOAD SIDES MAY BE SWITCHED TO SUIT FIELD CONDITIONS. IN ANY EVENT "S" BUSHING MUST BE TAPPED SOURCE CONDUCTOR, AND "L" BUSHING TAPPED TO LOAD CONDUCTOR.
4. DIMENSIONS SHOWN ASSUME CURRENTLY PURCHASED REGULATORS. OLDER MODELS MAY REQUIRE SOME DIMENSIONAL ADJUSTMENTS.
5. INSULATOR USED WHEN CONNECTING TO MIDDLE PHASE.

SUPERSEDES I-10.0.0 LAST REVISED ON 1-29-92

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
4	2/14/07	REMOVED WOOD POLE CLASS REQ., ENGINEERS NOTE & NOTE 5, CHANGED POLE SYLE CONCRETE	RR	ELS	JRD
3	10/15/04	ADD ANIMAL GUARD	LFV	ELS	JJM
2	5/22/01	ADDED CASE GROUND	GJP	JES	IA
1	7/23/99	UPDATE DRAWING REMOVE SOME TEXT	WPC	JES	JM
0	6/30/93	ORIGINAL REDRAWN-REVISED M&S NO. FOR BY-PASS SWITCH	IA	CL	FOR

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: IA DRAWN BY: CL

DATE: 6/30/93 APPROVED: R.J. SALESKY NO SCALE
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

I-51.0.0

WYE-CLOSED DELTA BANK
13 & 23KV
MODIFIED VERTICAL CONSTRUCTION

I-51.0.0

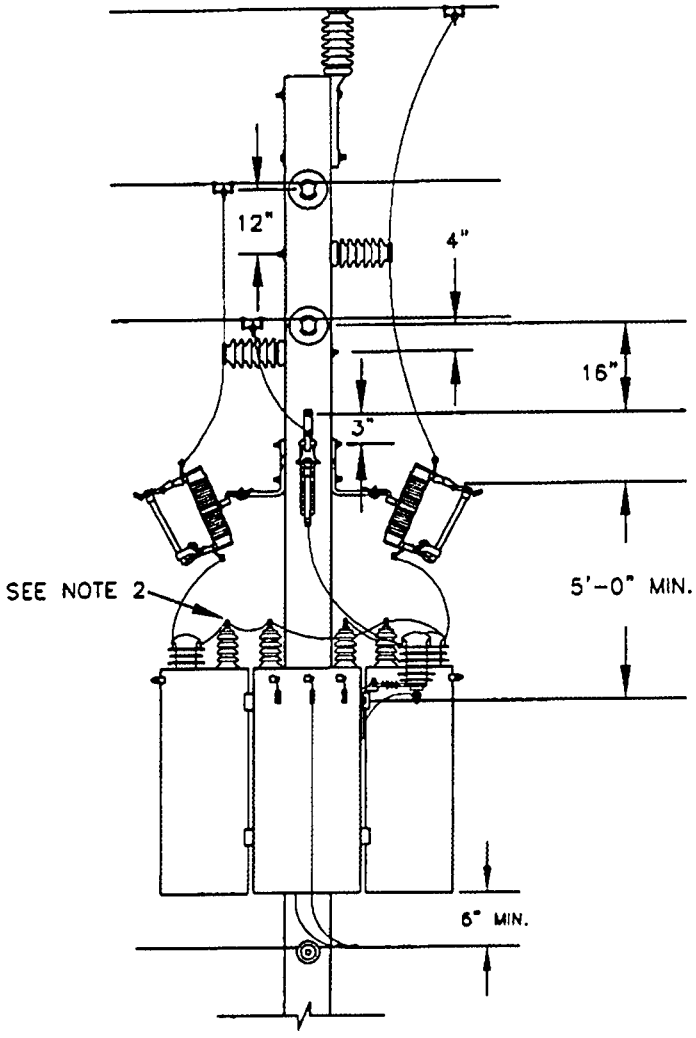


FIGURE 1

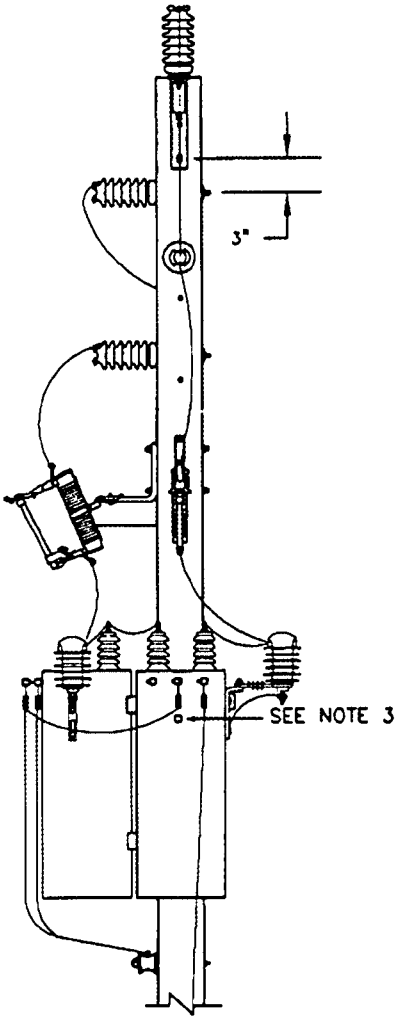


FIGURE 2

NOTES:

1. SEE SHEETS I-53.1.1 FOR SCHEMATIC DIAGRAMS OF TRANSFORMER CONNECTIONS.
2. DOUBLE PRIMARY BUSHING TRANSFORMERS ILLUSTRATED. FOR DETAILS OF SINGLE OR DOUBLE BUSHING GROUNDING. SEE SHEET I-5.0.0.
3. THE STRAP CONNECTING THE LOW VOLTAGE NEUTRAL TERMINAL TO THE TANK MUST BE REMOVED ON THE POWER TRANSFORMERS
4. SEE SECTION G-3.0.1 FOR GROUNDING DETAILS.
5. ALL NEW CONSTRUCTION OR REPLACEMENT TRANSFORMER POLES WITH 3-100 KVA OR LARGER TRANSFORMERS TO BE TYPE III-H OR 4.7 KIP SPUN CONCRETE POLES AND ACCESSIBLE BY AERIAL EQUIPMENT. FOR INNACCESSIBLE REPLACEMENT POLE USE A CLASS 2 WOOD POLE OR STRONGER.

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
2	3/8/07	INSERTED NOTE 5	RR	ELS	JRO
1	7/03/01	INCREASED MIN. DIMENSION	GJP	JES	IA
0	9/30/94	ORIGINAL DRAWING	ARR	RAS	RJS

ORIGINATOR: ARR

DRAWN BY: RAS

DATE: 9/30/94

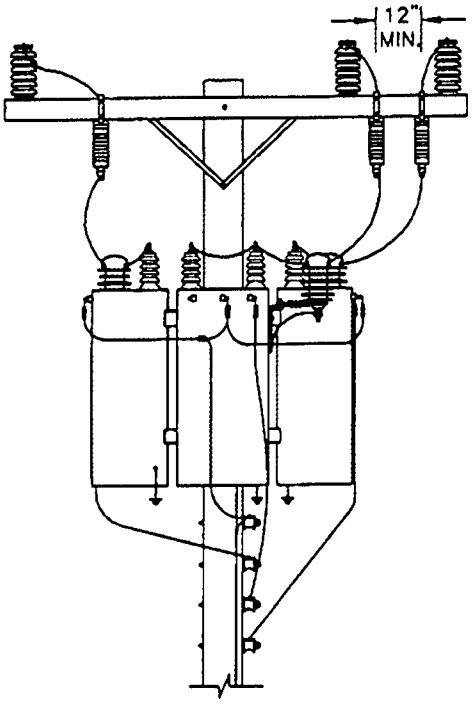
APPROVED: R.J. SALESKY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

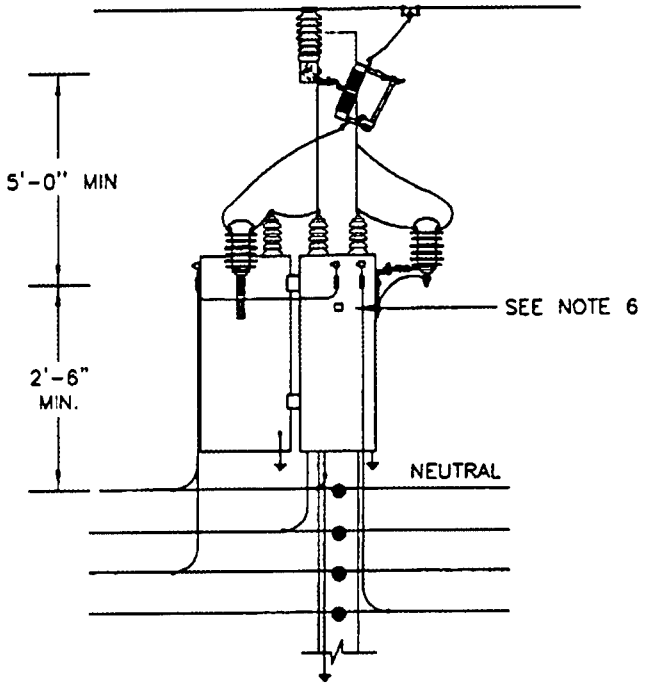
I-52.0.0

WYE-WYE BANK
13 & 23KV
CROSSARM CONSTRUCTION

I-52.0.0



FRONT



SIDE

NOTES

1. SEE SHEET I-3.2.0 FOR POLE CLASS REQUIRED.
2. SEE SHEET I-53.1.1 FOR SCHEMATIC DIAGRAM OF TRANSFORMER CONNECTIONS.
3. SEE PAGE I-3.0.0 FOR DETAILS OF CLUSTER BRACKET INSTALLATION.
4. SEE SECTION "G" FOR GROUNDING DETAILS.
5. IN SALT SPRAY CONTAMINATED AREAS BOND ALL STEEL PINS AND MOUNTING BRACKETS, USE SALT SPRAY ARRESTERS AND CUTOUTS AND INSTALL SALT SPRAY TYPE TRANSFORMERS.
6. THE GROUNDING STRAP FROM THE LOW VOLTAGE NEUTRAL BUSHING TO THE TANK MUST BE REMOVED ON ALL THREE TRANSFORMERS.
7. ALL NEW CONSTRUCTION OR REPLACEMENT TRANSFORMER POLES WITH 3-100 KVA OR LARGER TRANSFORMERS TO BE TYPE III-H OR 4.7 KIP SPUN CONCRETE POLES AND ACCESSIBLE BY AERIAL EQUIPMENT. FOR INNACCESSIBLE REPLACEMENT POLE USE A CLASS 2 WOOD POLE OR STRONGER.

SUPERSEDES I-52.0.0 LAST REVISED ON 3-1-89

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
	3/8/07	INSERTED NOTE 7	RR	ELS	JRD
	7/03/01	INCREASED MIN. DIMENSION	GJP	JES	IA
2	9/30/94	ADDED DIMENSION TEXT	ARR	PTH	RJS
1		CHANGED SPOOLS	ARR	EF	RJS
0	5/13/93	REDRAWN FROM MANUAL AND ADDED NEW FRAME	MV	EMH	RJS

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: MV

DRAWN BY: EMH

DATE: 5/13/93

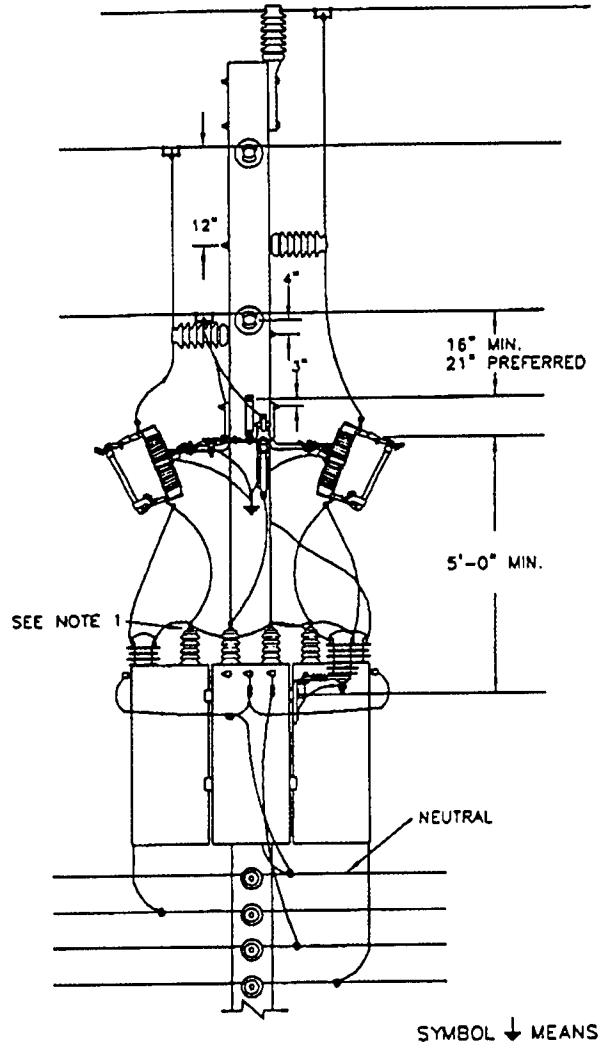
APPROVED: R.J. SALESKY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

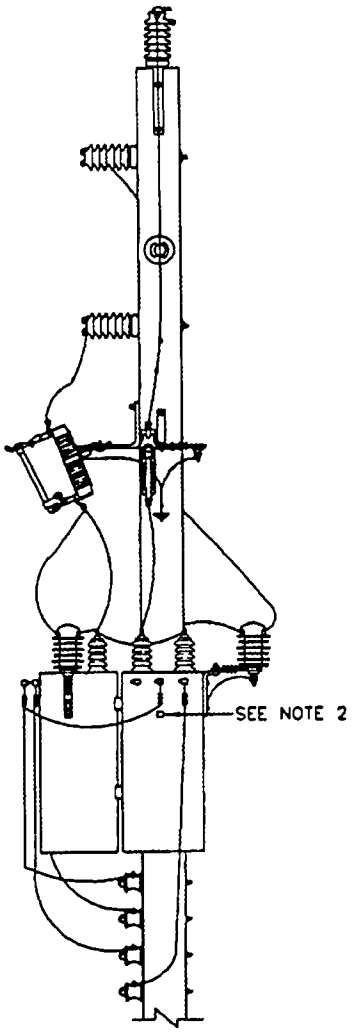
NO SCALE

I-52.0.2

WYE-WYE BANK
13 & 23KV
MODIFIED VERTICAL CONSTRUCTION

I-52.0.2





SYMBOL ↓ MEANS TO POLE GROUND

NOTES:

1. DOUBLE PRIMARY BUSHING TRANSFORMERS ILLUSTRATED, FOR DETAILS OF SINGLE OR DOUBLE BUSHING GROUNDING. SEE SHEET I-5.0.0
2. THE STRAP CONNECTING THE LOW VOLTAGE NEUTRAL TERMINAL TO THE TANK MUST BE REMOVED ON ALL THREE TRANSFORMERS.
3. SEE SHEET I-3.2.0 FOR POLE CLASS REQUIRED.
4. SEE SHEET I-53.1.1 FOR SCHEMATIC DIAGRAM ON TRANSFORMER CONNECTIONS.
5. SEE PAGE I-3 FOR DETAILS OF CLUSTER BRACKET INSTALLATION.
6. SEE SECTION "G" FOR GROUNDING DETAILS.
7. IN SALT SPRAY CONTAMINATED AREAS BOND ALL BOLTS AND METAL MOUNTING BRACKETS.
8. ALL NEW CONSTRUCTION OR REPLACEMENT TRANSFORMER POLES WITH 3-100 KVA OR LARGER TRANSFORMERS TO BE TYPE III-H OR 4.7 KIP SPUN CONCRETE POLES AND ACEESSIBLE BY AERIAL EQUIPMENT. FOR INNACCESSIBLE REPLACEMENT POLE USE A CLASS 2 WOOD POLE OR STRONGER.

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
3	3/8/07	INSERTED NOTE 8	RR	ELS	JRD
3	10/20/05	ADD ARRESTERS TO TRANSFORMER TANKS	IA	ELS	JRD
2	10/18/04	ADD ANIMAL GUARD	LFV	ELS	JJM
1	7/03/01	INCREASED MIN. DIMENSION	GJP	JES	IA
0	9/30/94	ORIGINAL DRAWING	ARR	MRB	RJS

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: ARR

DRAWN BY: MRB

DATE: 9/30/94

APPROVED: R.J. SALESKY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

CAPACITOR BANKS GENERAL

J-1.0.2

CUTOUTS AND FUSING

FOR NEW INSTALLATIONS FUSED AT 80K OR LESS, 100 AMP CUTOUTS SHALL BE USED. EXISTING 200 AMP CUTOUTS SHOULD REMAIN IN SERVICE AS LONG AS THEY ARE IN GOOD CONDITION. (FUSES RATED AT 100 AMPS OR LESS, AND USED IN A 200 AMP. BARREL, REQUIRE A SPECIAL 200 AMP BUTTONHEAD. M&S #531-8100-5). IF THE FUSETUBE ON AN EXISTING CUTOUT NEEDS TO BE REPLACED, THEN THE ENTIRE CUTOUT SHALL BE CHANGED OUT TO 100 AMPS.

CUTOUT INSTALLATION RECOMMENDATIONS

TO MINIMIZE CORROSION ON CONTACTS, CUTOUT FUSE BARRELS MUST ALWAYS REMAIN CLOSED WHEN THE BANK IS DE-ENERGIZED.

DO NOT WIREBRUSH THE CONTACTS ON THE CUTOUTS. THIS MAY DESTROY THE CONTACT PLATING AND LEAD TO POOR PERFORMANCE.

DO NOT USE INHIBITOR PASTE ON THE CONTACTS. ONLY APPROVED SWITCH LUBRICANT SHOULD BE USED WHEN REQUIRED.

FUSING TABLES

13 KV

PROTECTED BY STATION BREAKER

BANK SIZE (3 PHASE KVAR)	FUSE	FUSE M&S #
1200 KVAR	65 K	531-81300-4
600 KVAR	50 K	531-81200-8
300 KVAR	40 K	531-81700-0

23 KV

PROTECTED BY STATION BREAKER

BANK SIZE (3 PHASE KVAR)	FUSE	FUSE M&S #
1200 KVAR	40 K	531-81700-0
600 KVAR	40 K	531-81700-0

J

LARGEST SIZE OF THREE-PHASE CAPACITOR BANK BEYOND A RECLOSER.

PROTECTED BY RECLOSER (13KV)

BEYOND RECLOSER	GROUND TRIP SETTING	FUSE SIZE	MAX KVAR (3ø)	FUSE M&S #
160 RX	– 154	65 K 50 K	1200 600	531-81300-4 531-81200-8
140 RX	– 110 154	65 K 40 K 50 K	1200 300 600	531-81300-4 531-81700-0 531-81200-8
100 RX	– 110	50 K 40 K	600 300	531-81200-8 531-81700-0
70 RX	–	40 K	300	531-81700-0

PROTECTED BY RECLOSER (23KV)

BEYOND RECLOSER	GROUND TRIP SETTING	FUSE SIZE	MAX KVAR (3ø)	FUSE M&S #
160 RV THROUGH 70 RV	ALL VALUES	40 K	1200	531-81700-0

MOUNTING INSTALLATION:

ALL NEW OH CAPACITOR BANKS MUST BE INSTALLED ON CLASS III-H CONCRETE POLE OR EQUIVALENT.

SUPERSEDES J-1.0.2 LAST REVISED ON 6-22-95

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
1	12/5/06	ADD MOUNTING INSTALLATION NOTES	LFV	ELS	JJM
0	8/9/96	GENERAL REVISIONS	IA	RAS	JJM

ORIGINATOR: IA DRAWN BY: RAS

DATE: 8/9/96 APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

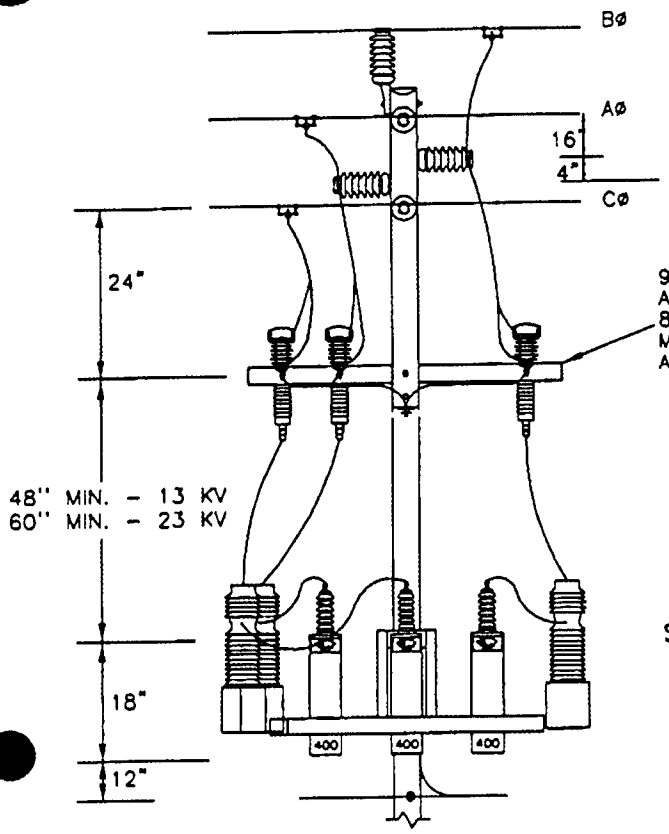
NO SCALE

J-2.0.2

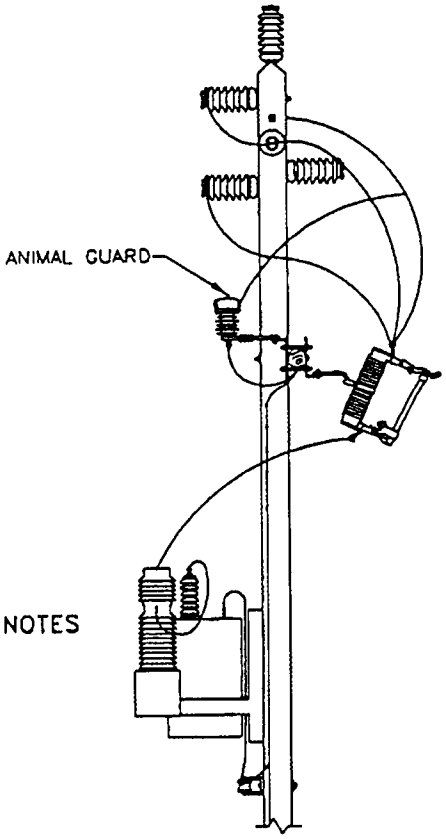
300, 600, AND 1200 KVAR CAPACITOR BANKS USING SINGLE PHASE 100 200, AND 400 KVAR UNITS 13 AND 23 KV

J-2.0.2

MODIFIED VERTICAL CONSTRUCTION

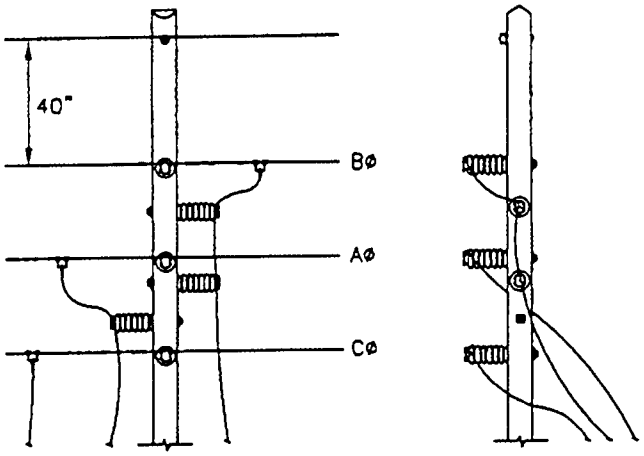


9' WOOD ARM SHOWN AS TYPICAL. 64" OR 8' STEEL CROSS ARM MAY BE USED AS APPROPRIATE



SEE CONSTRUCTION NOTES ON J-2.0.3

J



TO FUSE SWITCH SIMILAR TO J-2.0.3 FIGURE 3

OVERHEAD GROUNDWIRE VERTICAL CONSTRUCTION

NOTE:

1. ARRESTERS MUST BE CONNECTED SUCH THAT IN THE EVENT OF FAILURE, (DISCONNECTOR OPERATION) THE GROUND LEAD WILL NOT COME IN CLOSE PROXIMITY TO ENERGIZED CONDUCTORS OR EQUIPMENT.
2. POLE MUST BE CLASS III-H CONCRETE OR EQUIVALENT.

SUPERSEDES J-2.0.2 LAST REVISED ON 6-22-95

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
4	12/5/06	UPDATE NOTES	LFV	ELS	JJM
3	10/18/04	ADD ANIMAL GUARD	LFV	ELS	JJM
2	07/27/01	UPDATE DRAWING (ADD NOTE)	LFV	JES	JJM
1	08/09/96	GENERAL REVISION	IA	RAS	JJM

ORIGINATOR: IA DRAWN BY: RAS

DATE: 06/22/95 APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

J-2.0.3

300, 600, AND 1200 KVAR CAPACITOR BANK USING SINGLE PHASE 100, 200, AND 400 KVAR UNITS 13 AND 23 KV

J-2.0.3

MODIFIED VERTICAL CONSTRUCTION

CAPACITOR BANKS EQUIPPED WITH POTENTIAL TRANSFORMERS

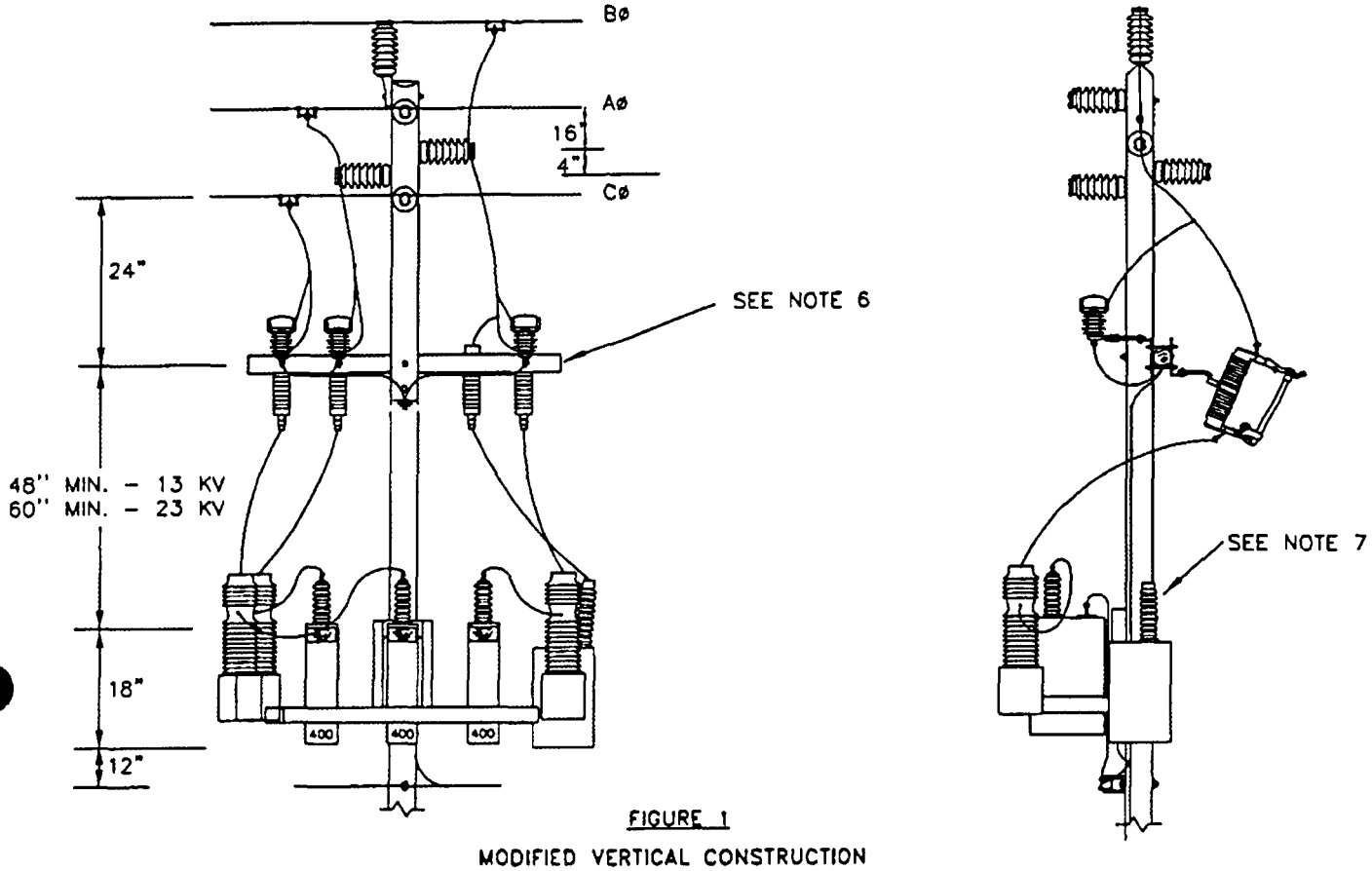


FIGURE 1

MODIFIED VERTICAL CONSTRUCTION

NOTES:

1. FOR FIXED BANKS, FUSE SWITCHES MUST BE INSTALLED ON OPPOSITE SIDE OF CAPACITOR BANK.
2. PORCELAIN ARRESTERS MUST ALWAYS REMAIN ENERGIZED EVEN WHEN THE BANK IS TAKEN OUT OF SERVICE, FOR LONG PERIODS.
3. EXISTING TRANSFORMER SERVICE FOR SWITCHED BANKS MUST NOT EXCEED 300 FEET. IF TRANSFORMER SERVICE IS NOT AVAILABLE WITHIN 300 FEET OR LESS USE CAPACITOR BANK EQUIPPED WITH RACK MOUNTED PT. SEE J-1.0.1 FOR M&S NUMBERS. DUE TO VOLTAGE REQUIREMENTS, FOR BANK SERVICES GREATER THAN 175 FEET USE #2 TRIPLEX INSTEAD OF #6 DUPLEX. FOR POTENTIAL REQUIREMENTS FOR CONTROLS OTHER THAN TIME OR RADIO CONSULT PLANNING DEPARTMENT.
4. FOR CONTROL CIRCUIT WIRING SEE J-3.0.2.
5. CLEARANCES SHOWN BETWEEN DEVICE ARM AND CAPACITOR BANK ARE RECOMMENDED FOR OPERATIONAL PURPOSES ONLY. REFER TO APPROPRIATE T&D PROCEDURES AND THE CAPACITOR SECTION OF SWITCHING MANUAL FOR INFORMATION PERTAINING TO SWITCHING CAPACITOR BANKS.
6. USE 9' ARM FOR ALL NEW CONSTRUCTION.
7. FOR 13KV AND 23KV APPLICATIONS, USE 3/4 A X FUSE M&S #531-600000-1 FOR RACK MOUNTED PT M&S #461-08813-0 (13KV) OR M&S #461-08823-7 (23KV).
8. THE CAPACITORS AND RACK SHALL BE GROUNDED PER THE BONDING NOTE ON J-1.0.1 AND THE PT SHALL BE GROUNDED PER I-5.0.0
9. POLE MUST BE CLASS III-H CONCRETE OR EQUIVALENT

SUPERSEDES J-2.0.3 LAST REVISED ON 6/22/95

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
6	12/5/05	ADD NOTE 9	LFV	ELS	JJM
5	10/18/04	ADD ANIMAL GUARDS	LFV	ELS	JJM
4	7/18/03	UPDATE DWG & REVISED NOTE 7	LFV	ELS	JJM
3	07/27/01	REVISED NOTES 2 AND 8	LFV	JES	JJM
2	9/22/99	REVISED NOTES 6 AND 8	LFV	JES	JJM
1	8/09/96	PLACED DRAWING IN REVISED FRAME	IA	RAS	JJM

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: IA

DRAWN BY: RAS

DATE: 6/22/95

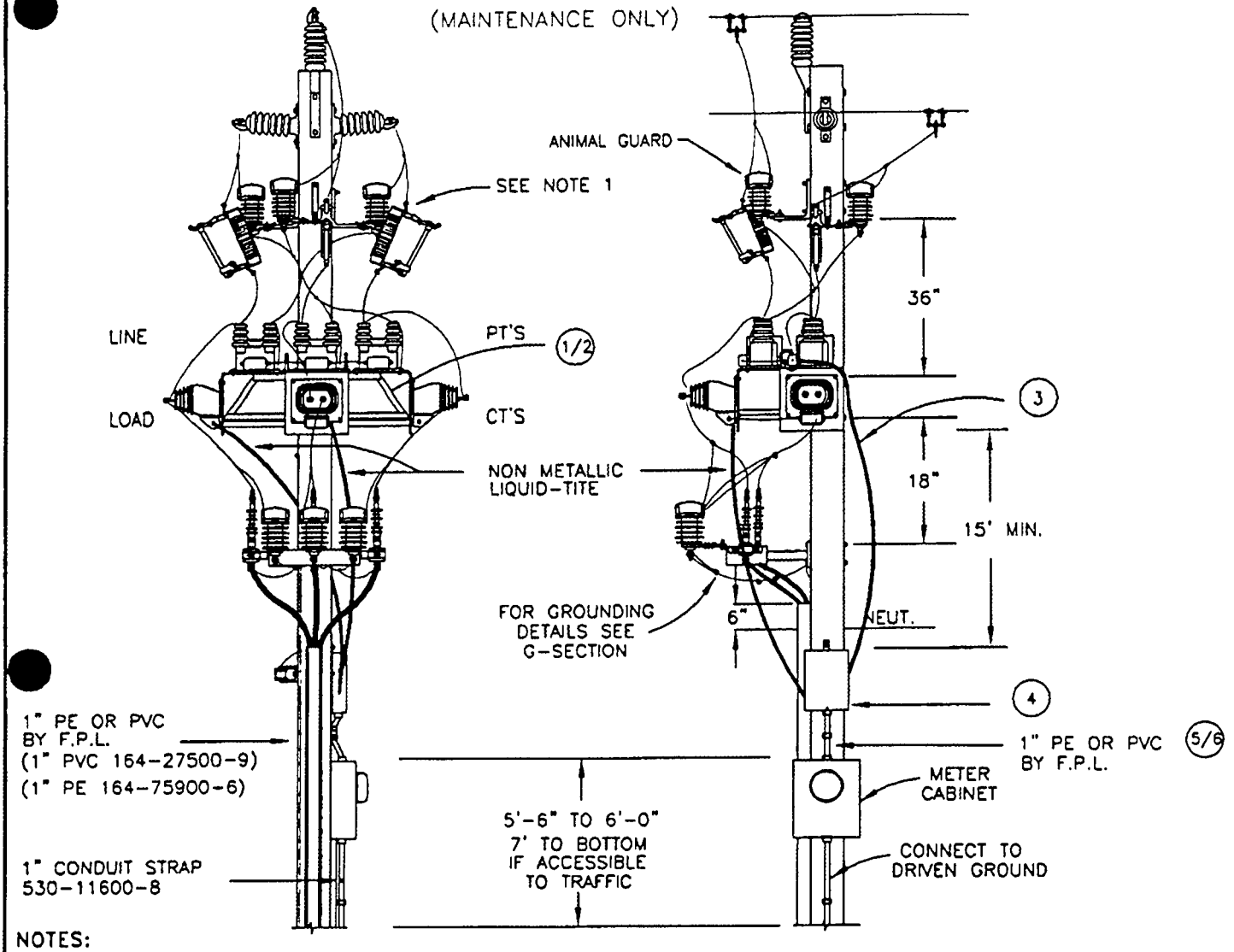
APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

K-28.0.0

OUTDOOR PRIMARY METERING INSTALLATION 13 & 23 KV CLUSTER MOUNTED UNDERGROUND SERVICE

K-28.0.0



K

NOTES:

1. THIS TYPE CONSTRUCTION CAN BE USED ON WOOD OR CONCRETE POLES. ON WOOD POLES WHICH NEED NOT BE CLIMBED, CONSTRUCTION MAY BE AS SHOWN ABOVE CONCRETE POLE. ON WOOD POLES WHICH MUST BE CLIMBED, PROTECTIVE DEVICES SHOULD BE CROSSARM MOUNTED TO FACILITATE OPERATION. REPLACEMENT POLES TO BE TYPE III-H OR 4.7 KIP SPUN CONCRETE POLES. FOR INACCESSIBLE REPLACEMENT POLE USE A CLASS 2 WOOD POLE.
2. ALL CONDUIT, METER CABINETS, RACK AND ONE PRIMARY TERMINAL OF PT'S TO BE GROUNDED TO SYSTEM NEUTRAL.
3. METER CABINET AND CONDUT MAY BE MOUNTED ON ANY QUARTER OF POLE AS NECESSARY TO CLEAR OTHER EQUIPMENT.
4. PT'S ARE TO BE TAPPED TO LINE SIDE.
5. PLEASE SEE K-28.1.1 FOR WIRING DETAILS
6. PREFERRED INSTALLATION IS TO RUN URD PRIMARY TO PAD MOUNTED PRIMARY METER.

ITEM	DESCRIPTION	M & S NUMBER
1	15 KV, 3 POSITION PRI METERING MOUNTS	420-71000-6
2	25 KV, 3 POSITION PRI METERING MOUNTS	420-71010-3
3	9/C CONTROL CABLE-NON METALLIC LIQUID-TITE	422-42000-5
4	UTB CABINET	420-00098-0
5	1 INCH PVC SCHEDULE 40	164-27500-9
6	1-1/4 INCH PVC SCHEDULE 40	164-27600-5

SUPERSEDES K-28 LAST REVISED ON 2-28-72

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
6	2/23/07	UPDATE NOTE1 & ADD NOTE 6	JNM	ELS	JJM
5	10/19/04	ADD ANIMAL GUARDS	LFV	ELS	JJM
4	9/5/03	UPDATE DRAWING	JFD	ELS	JJM
3	8/16/01	UPDATE DRAWING (TEXT AND CHART)	JFD	JES	JJM
2	10/6/99	MOVE UBT CAN AND UPDATE WIRING	JFD	JES	JJM
1	6/30/93	UPDATE ORIGINAL DRAWING	EM	EH	RJS

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: EM

DRAWN BY: E. HESS

DATE: 7/28/72

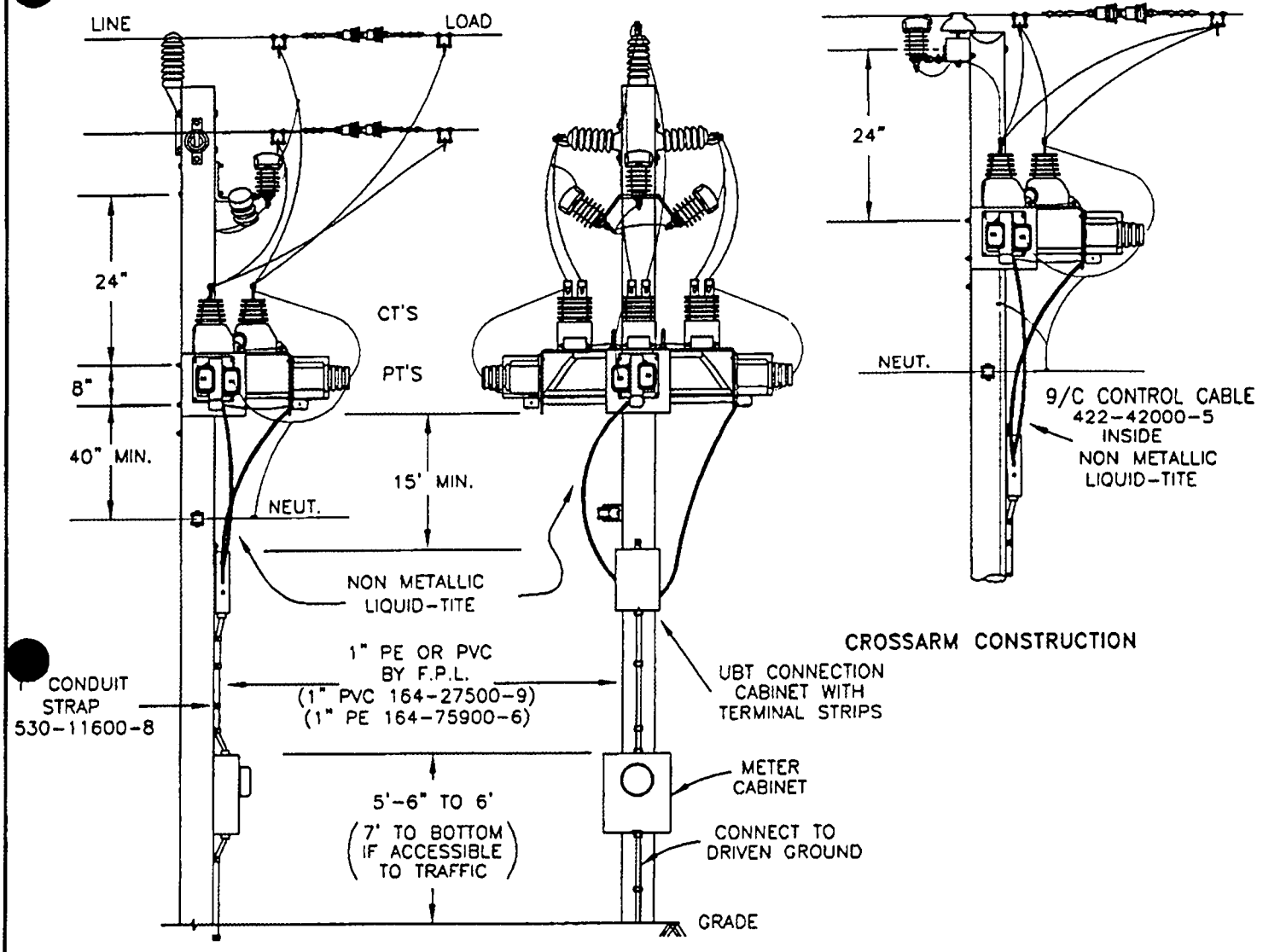
APPROVED: R.J. SALESKY
DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

NO SCALE

K-28.1.0

OUTDOOR PRIMARY METERING INSTALLATION 13 & 23 KV - CLUSTER MOUNTED OVERHEAD SERVICE

K-28.1.0



K

NOTES:

1. THIS TYPE CONSTRUCTION CAN BE USED ON WOOD OR CONCRETE POLES. ALL NEW CONSTRUCTION OR REPLACEMENT POLES TO BE TYPE III-H OR 4.7 KIP SPUN CONCRETE POLES. FOR INACCESSIBLE REPLACEMENT POLE USE A CLASS 2 WOOD POLE.
2. ALL CONDUIT, METER CABINETS, RACK AND ONE PRIMARY TERMINAL OF PT'S TO BE GROUNDED TO SYSTEM NEUTRAL.
3. METER CABINET AND CONDUIT MAY BE MOUNTED ON ANY QUARTER OF POLE AS NECESSARY TO CLEAR OTHER EQUIPMENT.
4. PT'S ARE TO BE TAPPED TO LINE SIDE.
5. PLEASE SEE K-28.1.1 FOR WIRING DETAILS
6. FUSE SWITCHES OR DISCONNECT SWITCHES ARE TO BE INSTALLED ON THE LINE SIDE AHEAD OF THIS POLE.

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
7	2/23/07	REVISE NOTE 1	JNM	ELS	JJM
6	10/19/04	ADD ANIMAL GUARDS	LFV	ELS	JJM
5	10/30/03	UPDATE DRAWING	JFD	ELS	JJM
4	9/5/03	UPDATE DRAWING	JFD	ELS	JJM
3	7/23/01	UPDATE DRAWING (TEXT)	RAP	JES	JJM
2	10/6/99	MOVE UBT CAN AND UPDATE WIRING	JFD	JES	JJM
1	6/30/93	REDRAWN ON CAD ADD CABINETS	EM	EH	RJS

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: EM

DRAWN BY: E. HESS

DATE: 2/28/72

APPROVED: R.J. SALESKY
DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

NO SCALE

M-2.0.0

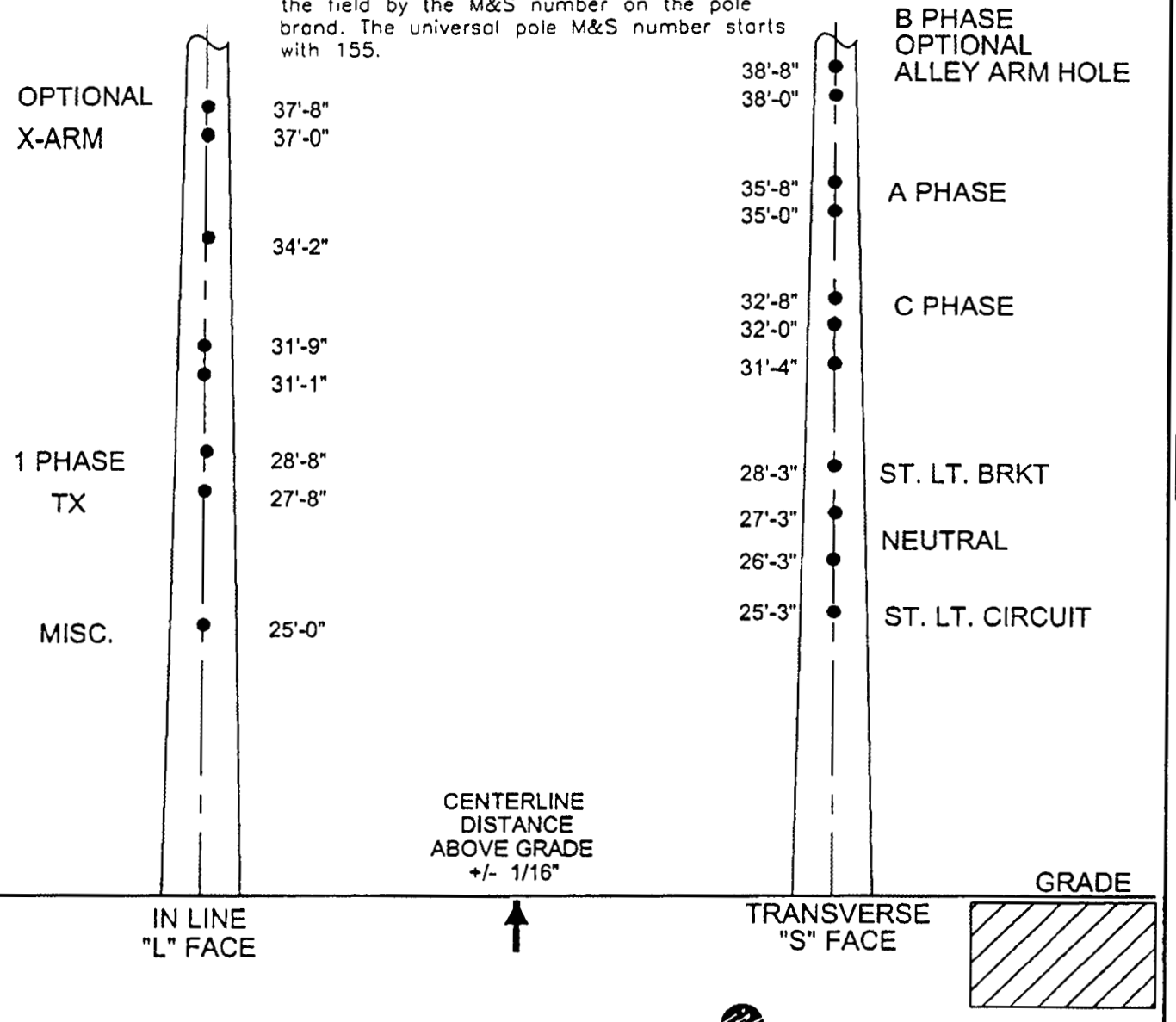
DISTRIBUTION CIRCUITS ON TRANSMISSION POLES UNIVERSAL SPUN CONCRETE POLE

M-2.0.0

The universal pole has holes arranged as shown below. The Universal pole is designed specifically with the holes shown. NO additional holes can be added either in the field or the manufacturing stage. This hole arrangement will allow for standard distribtuion framing:

1. Vertical with 36" separation between Phases
2. Tangent on 8'-6" Steel Crossarm
3. Tangent on 8'-6" Steel Alley Arm
4. Single phase Transformer
5. Lightning arrester Station

NOTE: UNIVERSAL POLES CANNOT BE FIELD DRILLED. Universal pole can be identified in the field by the M&S number on the pole brand. The universal pole M&S number starts with 155.



M

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
3	2/14/07	UPDATE DRAWING (TEXT)	JNM	ELS	JJM
2	3/15/04	UPDATE DRAWING (TEXT)	JNM	ELS	JJM
1	9/8/03	ORIGINAL DRAWING	JNM	ELS	JJM

ORIGINATOR: JNM DRAWN BY: ELS

DATE: 9/8/03 APPROVED: J.J. MCEVOY
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES

NO SCALE

UH-15.0.0

PRIMARY AND FEEDER RISER POLE POST INSULATOR AND VERTICAL DEADEND CONSTRUCTION

UH-15.0.0

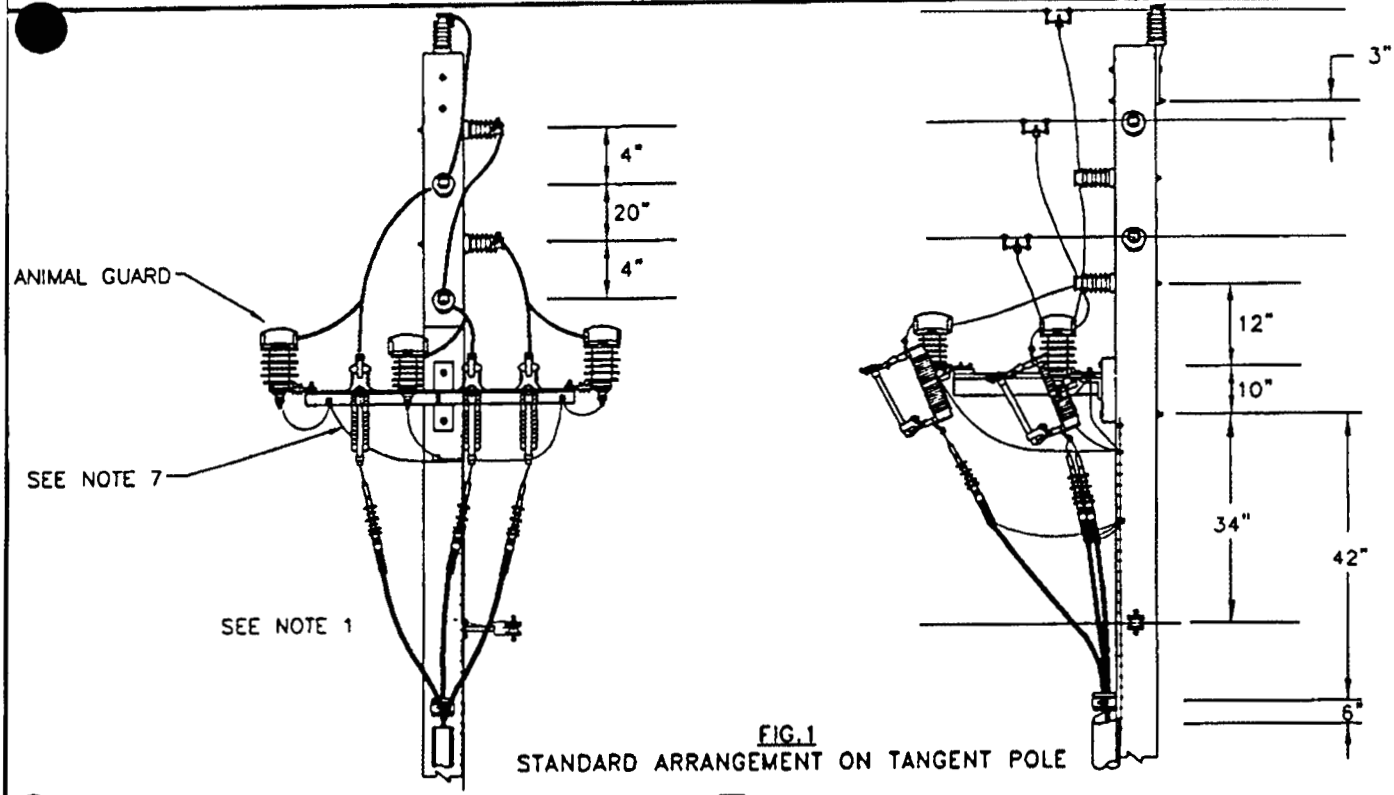


FIG.1
STANDARD ARRANGEMENT ON TANGENT POLE

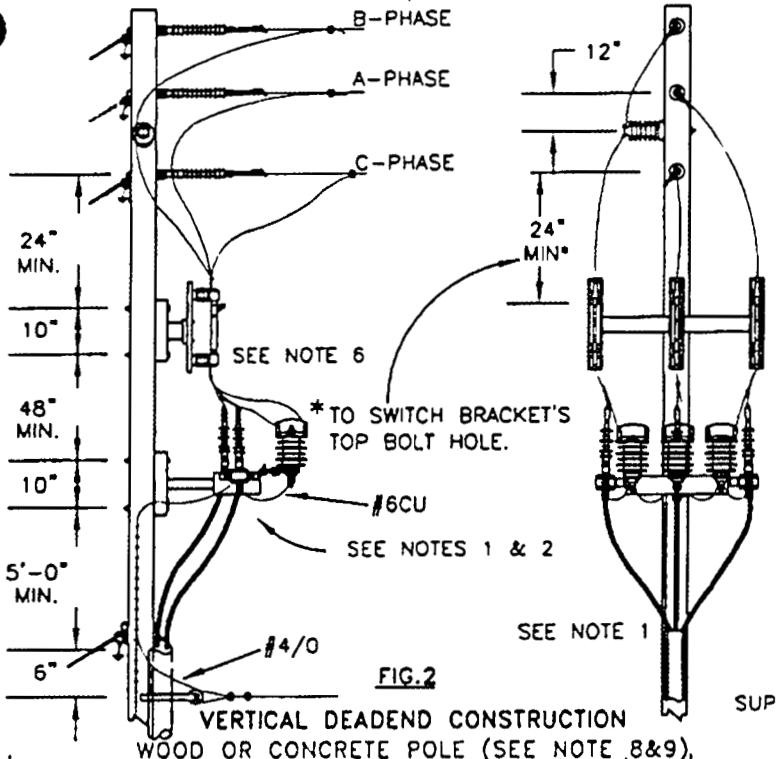


FIG.2
VERTICAL DEADEND CONSTRUCTION
WOOD OR CONCRETE POLE (SEE NOTE 8&9)

NOTES:

1. FOR BONDING AND GROUNDING DETATILS REFER TO SECTION "G".
2. INDIVIDUAL ARRESTER GROUND LEADS MUST BE LONG ENOUGH TO PERMIT PROPER OPERATION OF ISOLATOR.
3. PVC U-GUARD RISER SHOULD BE LOCATED ON POLE TO LEAVE SPACE FOR FUTURE STREET LIGHT BRACKETS.
4. PHASE IDENTIFICATION OF SWITCHES AND TERMINATORS SHOULD BE DETERMINED BY THE ASSOCIATED LINE CONDUCTORS RATHER THAN BY GEOGRAPHICAL LOCATION.
5. ADJUST MOUNTING ANGLE OF ARRESTERS SO SPACING BETWEEN LIVE PARTS IS 12" MIN.
6. USE ONLY DISCONNECT SWITCHES WITH 90° STOPS.
7. EACH ARRESTER GROUND LEAD SHOULD BE INDIVIDUALLY ATTACHED TO POLE BOND.
8. ALL NEW CONSTRUCTION OR REPLACEMENT "01" FEEDER SWITCH POLES TO BE TYPE III-H OR 4.7 KIP SPUN CONCRETE POLES AND ACCESSIBLE BY AERIAL EQUIPMENT. FOR INACCESSIBLE REPLACEMENT POLE USE A CLASS 2 WOOD POLE OR STRONGER.
9. ALL NEW CONSTRUCTION FEEDER SWITCH POLES ARE TO BE ACCESSIBLE.

SUPERSEDES UH-15.0.0 LAST REVISED ON 9-30-94

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
7	2/27/07	ADD NOTE 8 AND 9	JNM	ELS	JJM
6	9/17/03	UPDATE DRAWING	CEA	ELS	JJM
5	9/17/03	ADD ANIMAL GUARDS	LFV	ELS	JJM
4	8/27/03	UPDATE DRAWING (NOTES)	LFV	ELS	JJM
3	6/18/03	UPDATE DRAWING (NOTES)	LFV	ELS	JJM
2	8/07/01	UPDATE DRAWING (TITLE AND DIMENSIONS)	RCB	JES	JJM
1	8/09/96	CHANGED PORCELAIN SUSPENSION INSULATORS TO POLYMER AND ADDED NEW MOUNTING BRACKET.	PMG	RAS	JJM

FPL
OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: PMG
DRAWN BY: RAS
DATE: 9/30/94
APPROVED: JOSE R. DIAZ
SUPERVISOR, OH/UG PRODUCT SUPPORT SERVICES
NO SCALE

UH

UH-15.3.1

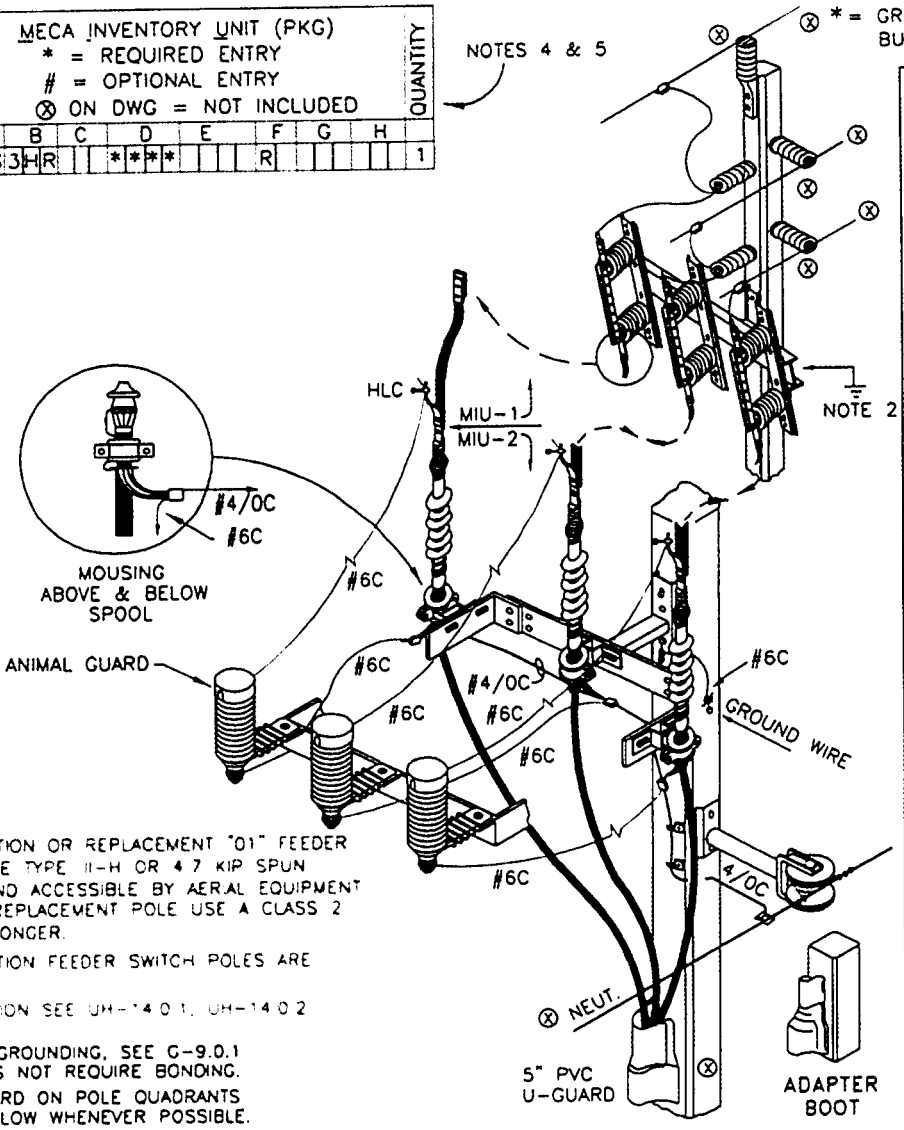
THREE PHASE FEEDER RISER
1000 KCMIL 15 OR 25 KV CABLE
FOR SALT SPRAY AND NON SALT SPRAY AREAS

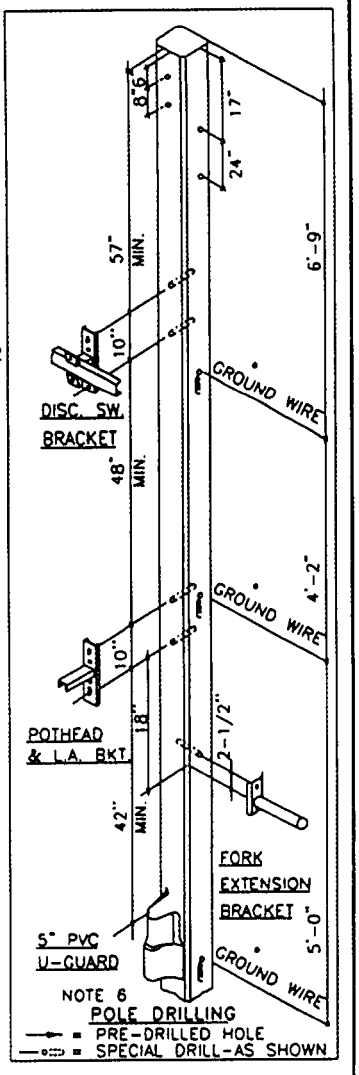
UH-15.3.1

PROCEDURE 49	MIU N°	MECA INVENTORY UNIT (PKG) * = REQUIRED ENTRY # = OPTIONAL ENTRY ⊗ ON DWG = NOT INCLUDED								QUANTITY
		A	B	C	D	E	F	G	H	
09.3	1	D	S3	HR	*	*	*	R		1

NOTES 4 & 5

* = GROUND WIRE IS ON LINE FACE, BUT IS SHOWN HERE FOR CLARITY.





NOTES:

1. ALL NEW CONSTRUCTION OR REPLACEMENT "01" FEEDER SWITCH POLES TO BE TYPE II-H OR 4.7 KIP SPUN CONCRETE POLES AND ACCESSIBLE BY AERIAL EQUIPMENT FOR INACCESSIBLE REPLACEMENT POLE USE A CLASS 2 WOOD POLE OR STRONGER.
2. ALL NEW CONSTRUCTION FEEDER SWITCH POLES ARE TO BE ACCESSIBLE
3. U-GUARD INSTALLATION SEE UH-14.0.1, UH-14.0.2 DETAILS
4. FOR BONDING AND GROUNDING, SEE G-9.0.1 PVC U-GUARD DOES NOT REQUIRE BONDING.
5. INSTALL PVC U-GUARD ON POLE QUADRANTS OPPOSITE TRAFFIC FLOW WHENEVER POSSIBLE.
6. INVENTORY UNITS DO NOT INCLUDE PVC U-GUARD RISER.
7. PULL UNITS REQUIRED FOR PRIMARY CONDUCTORS. SEE MECA PROCEDURE 4931.1 FOR EXPLANATION.
8. ILLUSTRATIONS ARE PROPORTIONALLY DRAWN. PRODUCT CONFIGURATION MAY VARY PER SUPPLIER. DIMENSIONS SHALL TAKE PRECEDENCE.

MAJOR MATERIAL	NON-SALT SPRAY AREAS 15 KV	NON-SALT SPRAY AREAS 25 KV	SALT SPRAY AREAS 15 KV	SALT SPRAY AREAS 25 KV
3 SWITCHES	270-38800-4	270-38800-4	270-39000-9	270-39000-9
1 SWITCH BRACKET	141-18200-4	141-18200-4	141-18200-4	141-18200-4
1 POTHEAD EXTENSION BRACKET	163-47400-8	163-47400-8	163-47400-8	163-47400-8
1 L.A. BRACKET	334-55100-4	334-55100-4	334-55100-4	334-55100-4
3 TERMINATORS	163-51100-1	163-51100-1	*163-51100-1	*163-51100-1
3 ZINC OXIDE RISER POLE ARRESTERS	334-22100-4	334-22800-9	334-22100-4	334-22800-9
3 SINGLE SPOOLS, 2-1/2"	160-30600-7	160-30600-7	160-30600-7	160-30600-7
3 U-SUPPORTS	161-50700-6	161-50700-6	161-50700-6	161-50700-6
3 BRAIDS	103-92000-1	103-92000-1	103-92000-1	103-92000-1
3 GROUND STUDS	122-65000-6	122-65000-6	122-65000-6	122-65000-6

* TERMINATOR 163-51100-1 CAN BE UTILIZED IN EITHER SALT SPRAY OR NON-SALT SPRAY AREAS.

SUPERSEDES UH-15-3-1 LAST REVISED ON 6-30-93

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
4	2/27/07	REVISE NOTES & ADD NOTE 1 & 2	JNM	ELS	JJM
3	9/18/03	ADD ANIMAL GUARDS	LFV	ELS	JJM
2	8/27/03	UPDATE NOTE 2	LFV	ELS	JJM
1	9/30/94	REVISED SWITCH M&S NO., RESIZED DRAWING TO FIT & ADDED BORDER	RWS	RAS	RJS

FPL

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: RWS DRAWN BY: RAS

DATE: 6/30/93 APPROVED: R.J. SALESKY
DIRECTOR, DISTRIBUTION ENGINEERING AND OPERATIONS SERVICES

NO SCALE

Z-12.0.1

SPUN CONCRETE POLE
POLE DIAMETER AND WEIGHT

Z-12.0.1

Spun Concrete Poles Dimensions					Spun Concrete Poles Approximate Weights in Pounds	
	50' and 55' Spun Concrete Pole	60' and 65' Spun Concrete Pole	70' Spun Concrete Pole		Length of Pole	Pole Weights
Distance From Top of Pole in Feet	Outside Dia.	Outside Dia.	Outside Dia.		50'	5,650
	(Inches)	(Inches)	(Inches)		55'	6,410
0 (Top)	9.55	11.35	11.07		60'	8,770
2	9.91	11.71	11.50		65'	9,790
4	10.27	12.07	11.93		70'	12,230
6	10.63	12.43	12.37			
8	10.99	12.79	12.80			
10	11.35	13.15	13.23			
12	11.71	13.51	13.66			
14	12.07	13.87	14.09			
16	12.43	14.23	14.53			
18	12.79	14.59	14.96			
20	13.15	14.95	15.39			
22	13.51	15.31	15.82			
24	13.87	15.67	16.25			
26	14.23	16.03	16.69			
28	14.59	16.39	17.12			
30	14.95	16.75	17.55			
32	15.31	17.11	17.98			
34	15.67	17.47	18.41			
36	16.03	17.83	18.85			
38	16.39	18.19	19.28			
40	16.75	18.55	19.71			
42	17.11	18.91	20.14			
44	17.47	19.27	20.57			
46	17.83	19.63	21.01			
48	18.19	19.99	21.44			
50	18.55	20.35	21.87			
52	18.91	20.71	22.30			
54	19.27	21.07	22.73			
56	19.63	21.43	23.17			
58		21.79	23.60			
60		22.15	24.03			
62		22.51	24.46			
64		22.87	24.89			
66		23.23	25.33			
68			25.76			
70			26.19			
Taper (In/ft)	0.18	0.18	0.216			

NOTE: POLE BRAND IS LOCATED 20' FROM THE BUTT OF THE POLE ON ALL SIZES.

F P L

OH & UG DISTRIBUTION SYSTEM STANDARDS

ORIGINATOR: RJO DRAWN BY: E.SCHILLING

DATE: 6/7/06 APPROVED: J.J. McEVOY
SUPERVISOR, OH / UG PRODUCT SUPPORT SERVICES

NO SCALE

NO.	DATE	REVISION	ORIG.	DRAWN	APPR.
2	12/18/06	UPDATE CHART	RJO	ELS	JJM
1	6/7/06	ORIGINAL	RJO	ELS	JJM

Z

Docket No. 070301-EI
FPL Storm Hardening Plan
Exhibit MBM-1 Page 132 of 223

Attachment Guidelines and Procedures

ADDENDUM

TO FPL'S PERMIT APPLICATION PROCESS MANUALS, ATTACHMENT AGREEMENTS AND JOINT USE AGREEMENTS

FPL ATTACHMENT STANDARDS AND PROCEDURES

MAY 4, 2007

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I. SAFETY

SAFETY

It is the responsibility of the attacher to ensure that all persons involved with the application for attachment to FPL poles, and all persons involved with the field engineering, design, installation, construction and ongoing maintenance of these attachments, comply with all applicable federal, state and local safety laws and regulations including the Occupational Safety and Health Act, the National Electrical Safety Code (NESC), any requirements of FPL and any additional safety requirements requested by FPL.

It is also the responsibility of the attacher to warn its employees and contractors that electrical facilities are high voltage facilities and to inform these persons as to safety and precautionary measures which he or she must use when working on or near FPL poles and other facilities.

Proper guying of cables must be accomplished by the attacher.

To ensure that poles are always accessible for workers, particularly in locations inaccessible to bucket trucks, cable risers installed on FPL poles must not interfere with climbing space on the pole.

In all cases, second and third party attachments will be limited to the NESC designated communication space below the electrical supply space on all distribution carried poles with FPL attached. At no time may the communication/CATV worker encroach upon the electric supply space on the pole. Governmental Entities requesting attachments to FPL street light facilities may have certain attachments (i.e. banners, holiday decorations, etc) to those facilities provided that the attachments are installed in accordance with the terms and conditions of their agreements for the use of such facilities.

For any device emitting radio frequency (RF) radiation, to ensure the health and safety of utility workers, attacher shall install electric service disconnects as part of attacher's equipment to enable utility crews and personnel to disconnect power when working on the poles used for attacher's devices. FPL crews will be instructed to disconnect power to attacher's devices prior to working on the pole and to reconnect power to the devices when the work is complete. Furthermore, the attacher MUST label the device with language that advises the utility worker of the emission of RF radiation and advises the utility worker to disable the device.

II. STANDARDS

II. A. ATTACHMENT CRITERIA

No attachment or increase in bundle size of an existing attachment may be made to an FPL pole without prior approval by FPL's permit application vendor or an FPL engineer. (See the Procedures section.) Wireline and telecommunication antenna attachments may only be made to FPL distribution poles. Wireline attachments may be made to transmission poles ONLY if FPL distribution facilities are also attached to the pole. Electric service will be provided to an off-pole location. Power Supplies are not allowed on the pole. Governmental Entities requesting attachments to FPL street light facilities may have certain attachments (i.e. banners, holiday decorations, etc) to those facilities provided that the attachments are installed in accordance with the terms and conditions of their agreements for the use of such facilities.

Attachment Criteria

NON JOINT USE POLE
(no telephone)

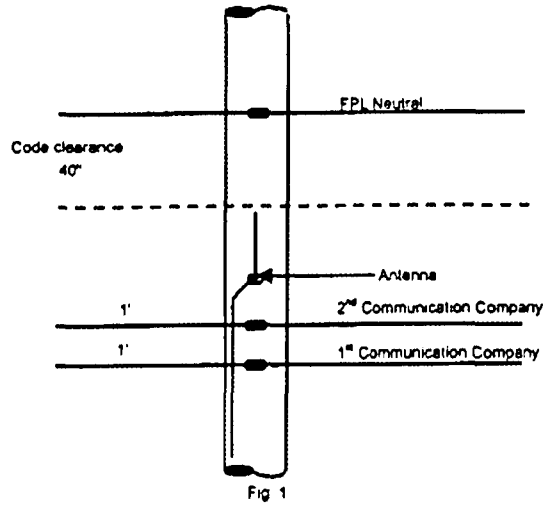


Fig. 1

1. The 1st cable attachment will be located at a height providing minimum clearance over roads, obstacles, etc.
2. All additional cable or antenna attachments will be located 1' above the highest existing communication cable, with antenna highest

JOINT USE POLE
(power & telephone)

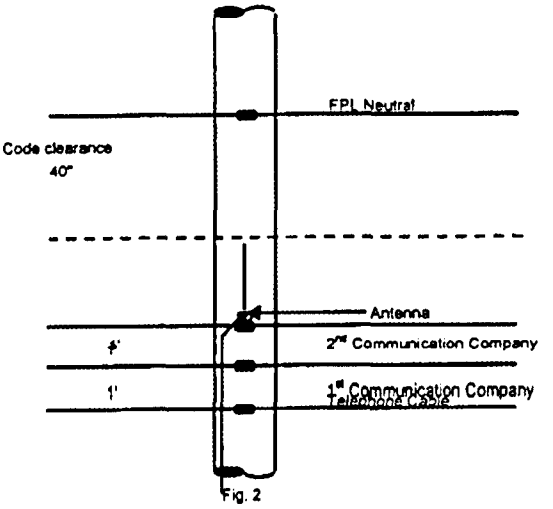


Fig. 2

1. The 1st cable attachment will be located 1' above Telephone's highest cable Attachment
2. The 2nd cable attachment will be located 1' above the existing communication cable
3. The antenna attachment will be a minimum of 1' above highest communication cable

NOTE: No communication cable or antenna attachment will intrude on the 40" NESC code clearance space.

Space Allocation

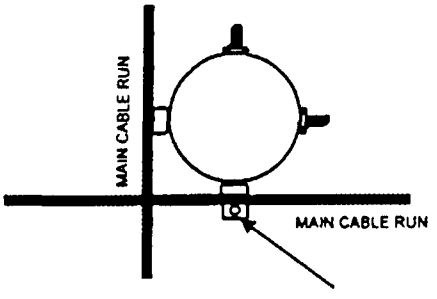


Fig. 3

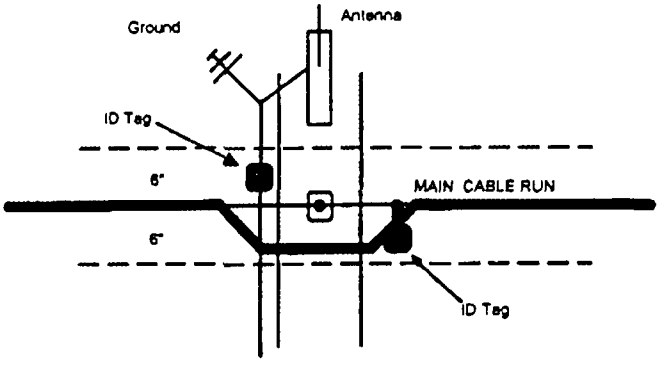


Fig. 4

POLE ATTACHMENT LOCATION

1. Attachment is limited to the communication space or lower.
2. All main cable attachments shall be located either on the same side of the pole as FPL's neutral or on one adjacent side
3. No main line cable attachments shall be located on the side of the pole opposite FPL's neutral
4. Only 2 sides of the pole, FPL's neutral and one adjacent side, shall be occupied on any given pole
5. All electrical connections must be made off the pole
6. No more than two risers will be allowed per pole FPL's service to Licensee may be one of these risers.

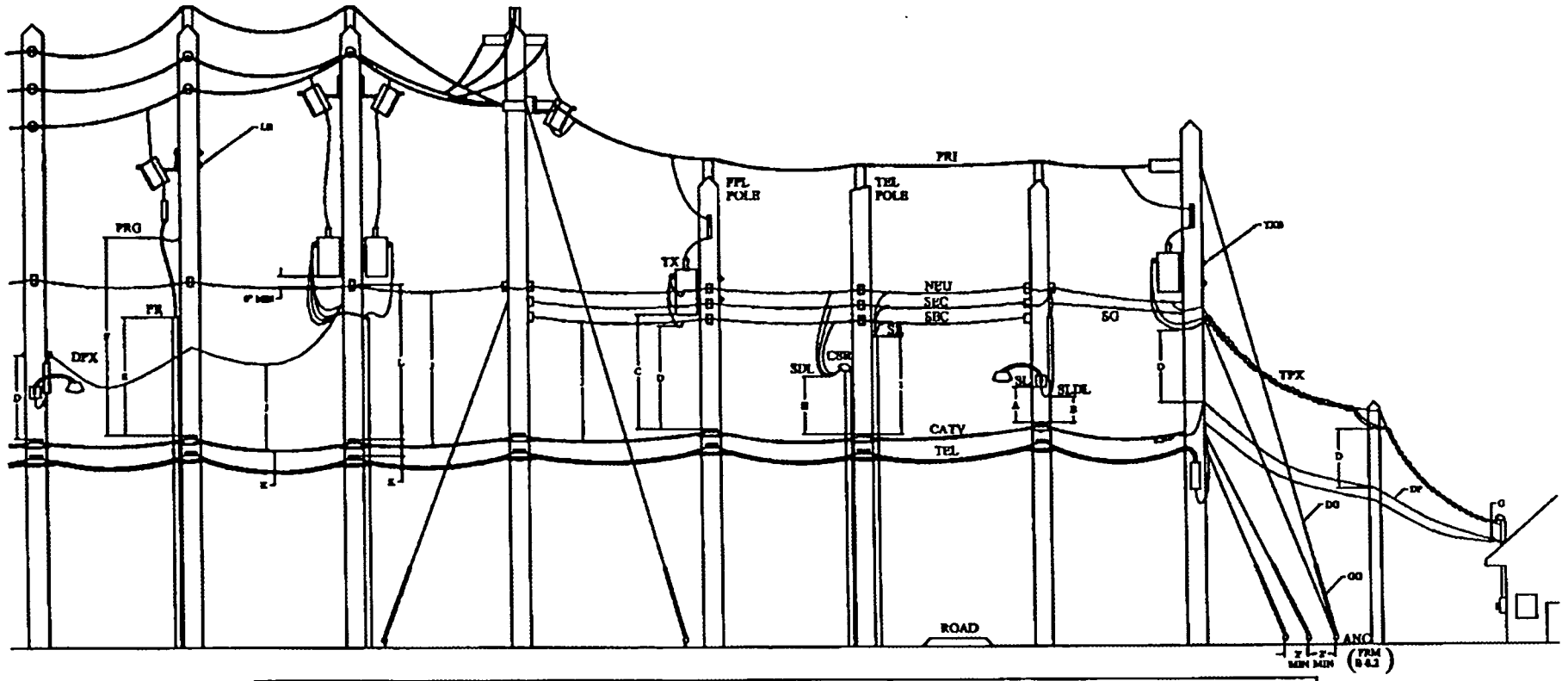
IDENTIFICATION TAG

1. Each separate attachment shall be identified in accordance with FUCC's Foreign Attachment Guidelines specifications.
2. Each company shall register their unique ID tag with the FUCC's Joint Use Subcommittee
3. An ID Tag will be installed at every pole attachment.

II.B. ATTACHMENT CLEARANCES

It is the responsibility of the attacher to ensure that attachments are designed and constructed in accordance with the National Electrical Safety Code and these guidelines, and to secure any necessary permit, consent or certification from state, county or municipal authorities or from the owners of the property to construct and maintain attachments to FPL poles. Wireless antenna clearance requirements are the same as the clearance requirements for CATV and telecommunications facilities.

CLEARANCES OF COMMUNICATION CABLES TO FPL & OTHER FOREIGN UTILITIES



CLEARANCES OF COMMUNICATION CABLES TO FPL & OTHER FOREIGN UTILITIES				
DIMENSION (LETTER)	SEPARATION FROM FOREIGN UTILITIES TO ..	* FPL MINIMUM REQUIREMENT	** NESC MINIMUM REQUIREMENT	NESC APPLICABLE REFERENCE SECTION
A	STREETLIGHT BRACKET	4 INCHES	4 INCHES	238 C, TABLE 238-2
B	STREETLIGHT DRIP LOOP	12 INCHES	12 INCHES	238 D
C	TRANSFORMER BOTTOM	30 INCHES	30 INCHES	238 B, TABLE 238-1
D	SVC DRP LP, SECONDARY	40 INCHES	40 INCHES	235, TABLE 235-5
E	PRIMARY RISER SHIELD	3 INCHES	NONE	239 G1, EXCEPTION 1
F	PRIMARY RISER GROUND	40 INCHES	40 INCHES	239 G1
G	SVC DROP AND DRIP LOOP	12 INCHES	12 INCHES	235 C1, EXCEPTION 3
H	CUSTOMER OWNED SERVICE DRIP LOOP	40 INCHES	40 INCHES	TABLE 235-5
		16" IF COMMUNICATION CABLE AND RISER OPERATED BY SAME UTILITY		TABLE 235-5 EXCEPTION 3
I	SERVICE RISER	40 INCHES	40 INCHES	239 G7
J	MID SPAN	30 INCHES	30 INCHES	238-1
K	FOREIGN UTILITIES	12 INCHES	12 INCHES AT POLE; 4 INCHES ALONG SPAN	235 H
L	NEUTRAL	40 INCHES ***	30 INCHES	TABLE 235-5 EXCEPTION 6

* FOLLOW FPL MINIMUM ** NESC INFORMATION PROVIDED FOR REFERENCE ONLY *** WHERE NO SEC IS PLANNED BY FPL, 30" MIN CLEARANCE IS PERMISSABLE IF COMMUNICATION IS BONDED TO FPL'S GROUNDING SYSTEM

II.C. WINDLOADING CRITERIA AND CALCULATIONS

Distribution Design Guidelines

The following guidelines will be used to standardize the design of FPL's overhead distribution facilities when practical, feasible and cost effective.

General

1. Every attempt should be made to place new or replacement poles in private easements or as close to the front edge of property (right of way line) as practical.

2. Overhead pole lines should be placed in front lot lines or accessible locations where feasible.

3. Concrete poles are not to be placed in inaccessible locations or locations that could potentially become inaccessible.

4. When performing work that will affect an existing Top CIF feeder, always contact Storm Secure regional project manager prior to design.

5. When performing new construction, the new pole line will be designed to meet Extreme Wind Load (EWL).

As always, good engineering judgment, safety, reliability, and cost effectiveness should be considered.

In addition to these guidelines, all distribution facilities shall be engineered to meet the minimum requirements set forth in all applicable standards and codes including but not limited to the National Electrical Safety Code (NESC), and Utility Accommodation Guide.

New Construction / Existing / Maintenance

1. When installing and/or replacing a feeder, lateral or service pole on an existing pole line, please reference the pole sizing guidelines listed under the Hardening Design Guidelines section (page 5 of 6) to determine pole class and type.

2. When performing work that will affect a Top CIF feeder, always contact Storm Secure regional project manager prior to design.

3. When extending an existing pole line, the existing pole type, wood or concrete, should be used as a guide for the new poles, while still maintaining the minimum requirements as set forth in these guidelines.

Relocation

1. When relocating either a concrete or wood pole line for a highway improvement project, the existing type pole line should be used as a guide for replacements.

2. When performing work that will affect a Top CIF feeder, always contact Storm Secure regional project manager prior to design.

3. Agency relocation projects should be coordinated with Distribution Planning to take into account potential feeder boundary changes.

Hardening Design Guidelines

The following hardening guidelines will standardize the design of FPL's overhead distribution facilities when feasible, practical and cost effective. Foreign pole owners are required to discuss design requirements with FPL prior to construction. FPL will assist with identifying the critical poles.

1. Concrete poles are preferred in the cases where replacement costs would be extremely high (i.e. Duct system riser pole, corner poles with multiple circuits, critical poles, etc). Please reference the Critical Pole list below for more information.

2. The following list comprises what will be considered critical poles. When installing and/or replacing an accessible critical pole, use concrete. If the pole is inaccessible, use a Class 2 wood pole, or consider relocating the equipment to an accessible concrete pole.

Critical Pole List
1st switch out of the substation [1]
Automated Feeder Switches (AFS)
Interstate / Highway Crossings [1,2]
Capacitor Banks
Poles with multiple primary risers
3 Phase Reclosers
Aerial Auto Transformers
Multi-Circuit Poles [3]
3 phase transformer banks (3-100 kVA and larger)
Regulators
Primary Meter

[1] *Every attempt should be made to install storm guys where feasible and practical.*
[2] *Refer to the Crossing Multi-Lane Limited Access Highways section for details (pg.4 of 6)*
[3] *Contact Storm Secure regional project manager before designing a new multi-circuit line.*

Crossing Multi-lane Limited Access Highways

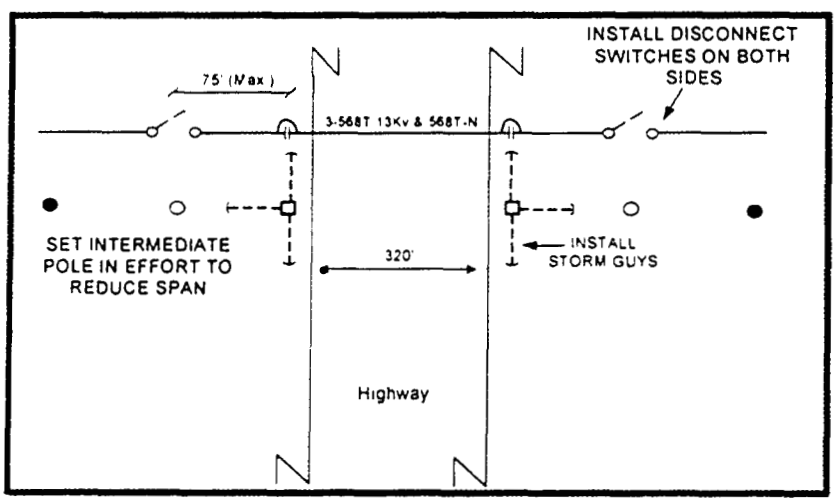
1. Underground installation is the preferred design for all NEW crossings (1, 2 or 3 phase) of multi-lane limited access highways. If underground construction is not feasible or if working on an existing overhead crossing, reference the Overhead Highway Crossing schematic as shown below.

2. Underground crossing for 1 or 2 phases should be designed for potential three phase feeder size cable.

3. For accessible overhead crossings, use concrete poles (III-H or Spun) for the crossing poles and Class 2 wood poles for the adjacent poles. For inaccessible overhead crossings, Class 2 wood poles should be used for the crossing poles and adjacent poles.

4. Every attempt should be made to install storm guys for the highway crossing poles. Storm guys are not required on the adjacent poles.

5. Install disconnect switches on adjacent poles on both sides of the crossing to isolate the feeder section in case of a restoration event. Disconnect switches are to be installed in accessible locations that can be reached with aerial equipment. If there is no load between the nearest existing disconnect switch and the crossing, an additional switch is not required.



Overhead Highway Crossing Schematic

Pole Sizing Guidelines

1. The following tables should be used as guidelines to help determine pole class and type, when installing and/or replacing a feeder, lateral or service pole.
2. When performing work that will affect a Top CIF feeder/customer always contact Storm Secure regional project manager prior to design.

Feeder or Three Phase Lateral:

Pole Line Description	New Construction[1]	Existing Infrastructure[2]	Installing or Replacing a Critical Pole[3]
Existing Wood	Use Class 2 Wood Pole to meet EWL	Use Class 2 Wood Poles	Use III-H (Accessible) or Use Class 2 Wood (Inaccessible)
Existing Concrete	Use III-H Concrete Pole to meet EWL	Use III-H Concrete Poles	Use III-H Concrete Poles

Single or Two Phase Lateral:

Pole Line Description	New Construction[1]	Existing Infrastructure[2]	Installing or Replacing a Critical Pole[3]
Existing Wood	Use Class 3 Wood Pole to meet EWL	Use Class 3 Wood Poles	Use III-H (Accessible) or Use Class 2 Wood (Inaccessible)
Existing Concrete	Use III-G[4] or III-H poles to meet EWL	Use III-G[4] or III-H poles to match existing line	Use III-H Concrete Poles

[1] To be used when extending or relocating a pole line. For span length details, see table below.
[2] To be used when replacing a pole or installing an intermediate pole within an existing pole line.
[3] Reference Critical Pole List on pg.3 of 6.
[4] Use of III-G poles should be limited to existing concrete lateral pole lines whose wire size is less than or equal to #1/0 Aluminum.

Facility	Phases(s)	Wire size	Pole size	Recommended Span Length[5] (FPL with 2 attachments – FPL ONLY)		
				105 MPH	130 MPH	145 MPH
Feeder		3#568 ACAR	Class 2	180' - 230'	135' - 200'	100' - 150'
		3#3/0 AAAC	Class 2	180' - 250'	180' - 250'	125' - 250'
Lateral	3 PH	3#1/0 AAAC	Class 2	180' - 250'	180' - 250'	155' - 250'
	2 PH	2#1/0 AAAC	Class 3	180' - 250'	180' - 250'	170' - 250'
	1 PH	1#1/0 AAAC	Class 3	180' - 250'	180' - 250'	180 - 250'

[5]The lower number equates to the maximum span for FPL primary and 2 foreign attachments. The higher number equates to the maximum span for FPL primary only. Reference the addendum DERM tables when adding additional attachment(s) or equipment. Remember to always contact the Storm Secure regional project manager when working on a Top CIF feeder.

Service / Secondary / Street Light / Outdoor Light Poles

When installing or replacing a secondary, service or street light pole, a minimum Class 4 Wood pole should be used. Specific calculations may require a higher class pole for large Quadruplex wire.

As always, good engineering judgment, safety, reliability, and cost effectiveness should be considered.

In addition to these guidelines, all distribution facilities shall be engineered to meet the minimum requirements set forth in all applicable standards and codes including but not limited to the National Electrical Safety Code (NESC) and Utility Accommodation Guide.

Storm Secure

Distribution Overhead Line Design for Extreme Wind Loading

ADDENDUM TO
DISTRIBUTION ENGINEERING REFERENCE MANUAL (DERM)

Introduction

In 2006, FPL introduced the concept of "STORM SECURE". One part of this concept is to harden the electrical system by adopting new standards based on extreme wind velocity criteria. The Florida Public Service Commission and the Florida Administrative Code have adopted the 2007 NESC for the applicable standard of construction.

FPL designs its distribution facilities based on the loading as specified in the 2007 National Electrical Safety Code (NESC) using Grade B Construction. The NESC specifies three weather conditions to consider for calculating loads:

Rule 250 B. Combined ice and wind loading (FPL current standard construction)
Rule 250 C. Extreme wind loading
Rule 250 D. Extreme ice with concurrent wind loading (this is a new loading condition in the 2007 NESC that will not impact FPL).

Prior to the hardening effort, FPL has been designing overhead distribution using the loads calculated under Rule 250 B. This addendum provides the designers the information needed to design projects using Rule 250 C, grade B (extreme wind loading) to calculate the loads, when it is determined that the particular pole line is to be designed to meet extreme wind loading (EWL) requirements. The NESC extreme wind map identifies 7 Basic Wind Speeds throughout Florida. In order to minimize the design effort to accommodate these 7 wind speeds, FPL has created 3 wind regions with designated wind speeds of 105 mph, 130 mph, and 145 mph. The Map shown in Figure 4.2.2-1 identifies the counties within our service territory that fall into the 3 wind regions. Whenever extreme wind designs are deployed, they will be designed to the identified wind speed for the location of the work to be done.

4.2.2 Poles Structures and Guying

A. Poles, General Information

1. *Pole Brands*

The pole brand includes the pole length & class, the type of treatment, the manufacturer, the date the pole was manufactured and FPL.

Wood Poles –This brand is located at 15' from the bottom of the pole.

Square (cast) Concrete poles – the brand up until 2007 was located 15' from the bottom. New specifications now require the brand to be at 20' from the bottom of the pole.

Distribution Spun Concrete poles – The brand information is on a metal tag that is located 20' from the bottom of the pole.

2. *Design Specifications*

The NESC specifies 3 Grades of construction: Grade B, Grade C, and Grade N with Grade B being the strongest of the three. These grades of construction are the basis for the required strengths for safety. FPL uses Grade B Construction for all distribution facilities. This means that the calculated loads must be multiplied by "Load Factors" and the calculated or specified strength of structures must be multiplied by "Strength Factors". The Strength multiplied by the Strength Factor (SF) must be equal to, or greater than the Load multiplied by the Load Factor (LF).

Equation 4.2.2-1

$$Strength \times Strength\ Factor \geq Load \times Load\ Factor$$

Table 4.2.2 – 1 below lists the Load Factors and Strength Factors for Grade B Construction from NESC Table 253-1 and Table 261-1A.

Table 4.2.2 - 1 Extreme Wind
Strength Factors & Load Factors

Strength of	Strength Factor
Wood Poles	0.75
Concrete Poles	1.00
Composite Poles	1.00
Support Hardware	1.00
Guy Wire	0.90
Guy Anchor and Foundation	1.00
	Load Factor
Extreme Wind Loads	1.00

FPL uses the NESC Extreme Wind Loading for its design criteria. As such, identify the wind speed for the job location and determine the load based on the following formula.

Equation 4.2.2-2

$$\text{Load in pounds} = 0.00256 \times (V_{mph})^2 \times k_z \times G_{RF} \times I \times C_f \times A(ft^2)$$

Where,

0.00256 - Velocity-Pressure Numerical Coefficient
V -Velocity of wind in miles per hour (3 second gust)
k_z -Velocity Pressure Exposure Coefficient
G_{RF} -Gust Response Factor
I -Importance Factor, 1.0 for utility structures and their supported facilities.
C_f - Force Coefficient (Shape Factor)
For Wood & Spun Concrete Poles = 1.0
For Square Concrete Poles = 1.6
A - Projected Wind Area, ft^2.

The NESC provides formulas for calculating k_z and G_{RF}. However, Tables are also provided and Table 4.2.2-2 below shows the values needed for most distribution structures.

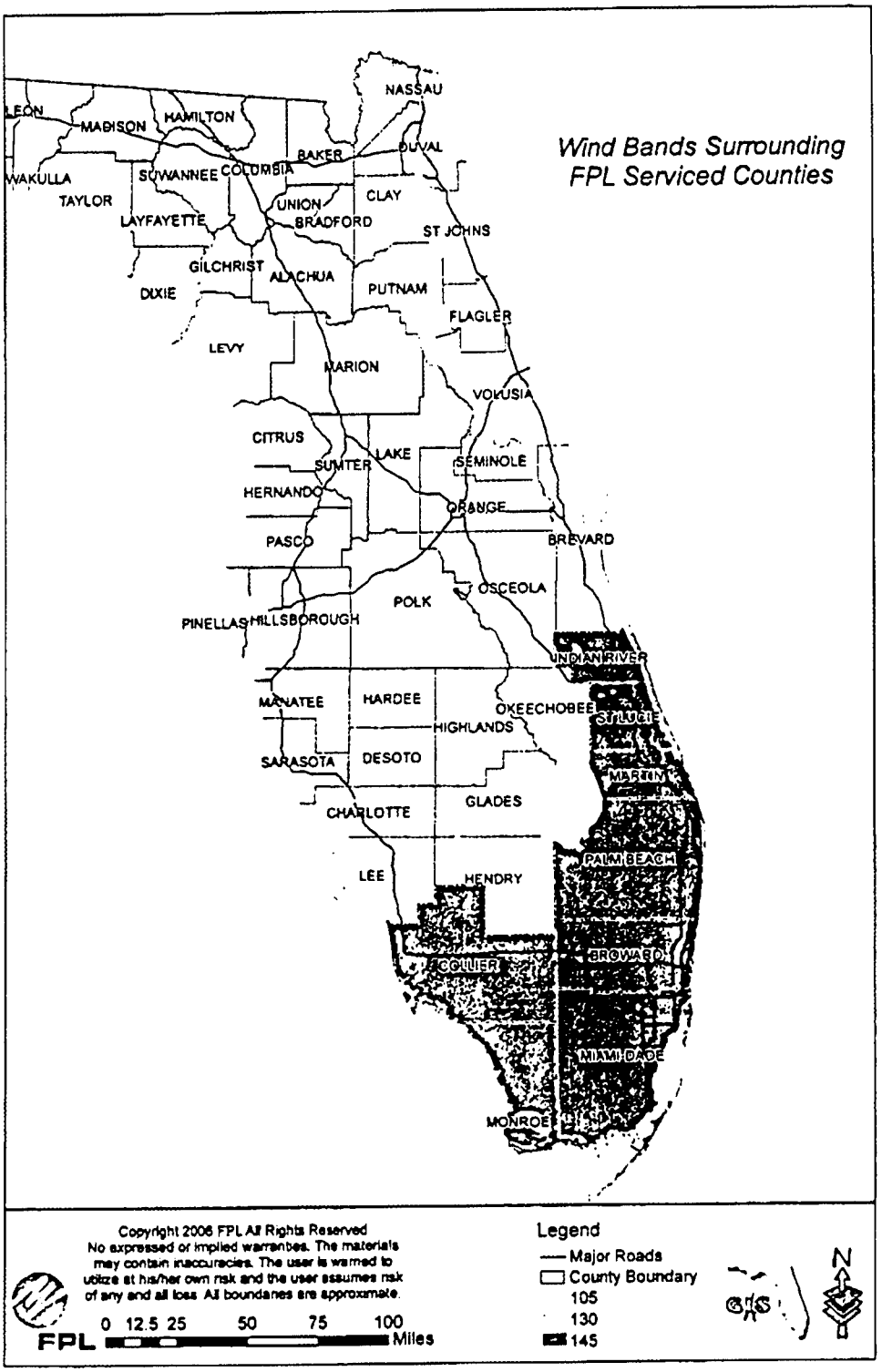
Table 4.2.2-2 Velocity pressure Exposure coefficient (k_z) and Gust Response Factors (G_{RF})

	Structure		Equipment		Wire		
Height (h)	k_z [1]	G_{RF} [4]	k_z [2]	G_{RF} [5]	k_z [3]	G_{RF} [4] (L ≤ 250 ft)	G_{RF} [4] (250 < L ≤ 500 ft)
≤ 33	0.9	1.02	1.0	1.02	1.0	0.93	0.86
>33 to 50	1	0.97	1.1	0.97	1.1	0.88	0.82
>50 to 80	1.1	0.93	1.2	0.93	1.2	0.86	0.80

1. h for the pole k_z is to be the height of the pole above ground
2. h for the equipment k_z is the height of the center of the area of the equipment above ground
3. h for the wire k_z is the height of the wire above ground
4. h for the G_{RF} is the height above ground for the structure and the wire
5. h for the G_{RF} for the equipment is based on the height of the structure above ground
6. L = design wind span (average of span on both sides of structure)

The wind speeds to be used are shown in Figure 4.2.2 – 1

Figure 4.2.2 –1 Wind Regions by County



3. Wood Pole Strength

The strength of wood poles is specified in the American National Standard – ANSI O5.1-2002. In addition to strength of wood poles, this standard specifies dimensions, shape, sweep spiral grain, knots, and many other characteristics of wood poles.

A change from previous calculations shown in the DERM for allowable pole strength is that the circumference to be used is now considered to be the ground line circumference rather than the "fixity" point circumference. Another change is the strength factor to be used. For extreme wind the strength factor for wood poles is 0.75 (see Table 4.2.2-1)

Example 4.2.2-1:

Determine the pole strength for wind loading on a 45'/2 wood pole that is set 7 feet.

Equation 4.2.2-3 $M_r = 0.000264fC^3$

Where

M_r	=	Moment (ultimate or long term bowing) measured in foot-pounds
f	=	Fiber Stress (8000 or 1000 psi for Southern Yellow Pine)
C	=	Circumference at ground Line (in this example circumference = 40.1 inches)

M_r = $0.000264 \times (8{,}000) \times (40.1)^3 = 136{,}184$ ft.-lbs.

This is the strength for the 45'/2 wood pole. However for design, apply the NESC Strength Factor of 0.75.

The strength of the 45'/2 wood pole = 136,184 x 0.75 = 102,138 ft.-lbs.

4. Concrete Pole Strength

The strength of concrete poles is based on the application of a designated load at a specified location on the pole. This load is measured in KIPS = 1,000 pounds per KIP. A 5 KIP pole is rated based on applying 5,000 pounds of load at two feet below the top of the pole. Most distribution poles are rated by applying the load at two feet down from the top. However, for the type "O", "S", and "SU" poles, this load is applied at one foot down from the top. Like wood poles, concrete poles have a continuous rating (loads that are

always on the pole) and a temporary rating (wind loads that come and go). Spun concrete poles (unlike other FPL distribution concrete poles) are designated by their KIP rating rather than a type (i.e., O, S, SU, III, III-G, III- H). Table 4.2.2-3 List the ratings (in KIPS) for the various concrete poles.

Table 4.2.2-3 Concrete Pole Ratings

Pole Type	Temporary Rating	Continuous Rating
O	0.85	0.26
S & SU	0.90	0.30
III	1.30	0.56
III-A	1.30	0.60
III-G	2.40	0.90
III-H	4.20	1.20
12 KIP (square)	8.40	2.40
Spun Concrete		
4.0 KIP	4.00	1.73
4.7 KIP	4.70	2.54
5.0 KIP	5.00	3.03

To calculate the strength of the pole use the following:

For O, S, SU,

M_r = Rating (Table 4.2.2-3) x (Pole Length – setting depth - 1 foot)

Example: 35' Type SU for extreme wind loading

M_r = 0.9 KIPS x (35 – 7.5 - 1) = 23,850 ft-lbs

For III, III-A, III-G, III-H

M_r = Rating (Table 4.2.2-3) x (Pole Length – setting depth - 2 feet)

Example: 50' Type III-H for extreme wind loading

M_r = 4.2 KIPS x (50 – 11.5 – 2)) = 153,300 ft-lbs

For Spun Concrete

M_r = Rating (Table 4.2.2-3) x (Pole Length – setting depth - 2 feet)

Example: 50'/ 4.7 KIP for extreme wind loading

M_r = 4.7 KIPS x (50 – 11 - 2) = 173,900 ft-lbs

For pre-stressed concrete poles, the NESC extreme wind strength factor = 1.0. The values calculated above will be the correct strength for concrete poles.

B. Wind Loading

1. *Wind Loading on poles.*

To calculate the wind load on the pole:

a. Calculate the area of the pole exposed to the wind

Equation 4.2.2-4 $$A = H_1(\frac{a+b}{2})(\frac{1}{12}'')$$

A = projected area above ground line in square feet.
H_1 = the pole's height above the ground line in feet.

For wood and spun concrete poles,
a = diameter at top of pole in inches.
b = diameter of pole at ground line in inches.

For square concrete poles, dimensions a and b are the widths of one face at top and ground line respectively.

b. Calculate the center of the area.

Equation 4.2.2-5 $$H_{CA} = \frac{H_1(b+2a)}{3(b+a)}$$

H_{CA} is used to calculate the ground line moment due to the wind force.

c. Calculate the wind force acting on the area (see Equation 4.2.2-2 with explanation of terms)

Load in pounds = $0.00256 \cdot (V_{mph})^2 \cdot k_z \cdot G_{RF} \cdot I \cdot C_f \cdot A(ft^2)$

Example Calculation for Wood Pole

Pole Length/Class =	45'/2
Setting depth =	7'
Wind Region =	145 mph

$$Projected\ Area.\ A = H_1(ft.)\,x\,\frac{1\,ft}{12\,in}\,x\left[\frac{a+b(inches)}{2}\right]$$

The circumference at the top of a 45'/2 pole is 25",

$$a = \frac{25"}{\pi} = 7.96"$$

The circumference at 38 ft. below the pole top 40.1", $b = \frac{40.1"}{\pi} = 12.76"$

$$A = \frac{38}{12}\,x\left[\frac{7.96+12.76}{2}\right] = 32.81\,sq.\,ft.$$

$$Height\ of\ center\ of\ area,\ H_{CA} = \frac{H_1(b+2a)}{3(b+a)} = \frac{38(12.76+15.92)}{3(12.76+7.96)}$$

H_{CA} = *Moment Arm* = 17.53 *ft.*

Wind Load on Pole =

0.00256 x $(145)^2$ x 1.0 x 0.97 x 1.0 x 1.0 x 32.81 = **1713 lbs**

Where:

k_z is based on h = 38'; k_z = 1.0

G_{RF} is based on h = 38'; G_{RF} = 0.97

C_f = 1.0 for wood and spun concrete poles

C_f = 1.6 for square concrete poles

This load must then be multiplied by the Load Factor, which for extreme wind equals 1.0 and the moment arm to obtain the Ground Line Moment (M_P) of the wind acting on the pole only.

Equation 4.2.2-6

M_P = Wind Load x Load Factor x Moment Arm.

M_P = 1713 lbs x 1 x 17.53 ft. = 30,030 ft. lbs.

The strength of this pole, previously calculated is 102,138 ft.-lbs. The pole itself has used up 29% (30,030/102,138) of its capacity for 145 mph extreme wind. Subtracting the wind load from the strength leaves 72,108 ft-lbs (102,138 – 30,030) for conductors and other attachments.

Example Calculation for Square Concrete Pole

Pole Length/Class = 50'/III-H
Setting depth = 11.5'
Wind Region = 145 mph

$$Projected\ Area.\ A = H_1(ft.)\,x\,\frac{1\,ft}{12\,in}\,x\left[\frac{a+b(inches)}{2}\right]$$

From Table H, the width of the pole at the top a = 9.00"
The width at ground line, b = 15.75"

$$A = \frac{38.5}{12}\,x\left[\frac{15.75+9.00}{2}\right] = 39.70\,sq.\,ft.$$

$$Height\ of\ center\ of\ area,\ H_{CA} = \frac{H_1(b+2a)}{3(b+a)} = \frac{38.5(15.75+18.00)}{3(15.75+9.00)}$$

$$H_{CA} = Moment\ Arm = 17.5\ ft.$$

Wind Load on Pole =
0.00256 x $(145)^2$ x 1.0 x 0.97 x 1.0 x 1.6 x 39.7 = **3317 lbs**
Where:
k_z is based on h = 38.5'; k_z = 1.0
G_{RF} is based on h = 38.5'; G_{RF} = 0.97
C_f = 1.0 for wood and spun concrete poles
C_f = 1.6 for square concrete poles

This load must then be multiplied by the Load Factor, which for extreme wind equals 1.0 and the moment arm to obtain the Ground Line Moment (M_P) of the wind acting on the pole only.

M_P = Wind Load x Load Factor x Moment Arm.
M_P = 3317 lbs x 1 x 17.5 ft. = 58,040 ft. lbs.

The strength of this pole, previously calculated is 153,300 ft.-lbs. The pole itself has used up 38% (58,040/153,300) of its capacity for 145 mph extreme wind. Subtracting the wind load from the strength leaves 95,260 ft-lbs (153,300 – 58,040) for conductors and other attachments.

Example Calculation for Spun Concrete Pole

Pole Length/Class = 50'/4.7 KIP
Setting depth = 11'
Wind Region = 145 mph

$$Projected\ Area.\ A = H_1(ft.)\,x\,\frac{1\,ft}{12\,inc.}\,x\left[\frac{a+b(inches)}{2}\right]$$

From Table H, the diameter of the pole at the top a = 9.55"
The diameter at ground line, b = 16.57"

$$So\ A = \frac{39}{12}\,x\left[\frac{9.55+16.57}{2}\right] = 42.45\,sq.\,ft.$$

$$Height\ of\ center\ of\ area,\ H_{CA} = \frac{H_1(b+2a)}{3(b+a)} = \frac{39(16.57+19.1)}{3(16.57+9.55)}$$

$$H_{CA} = Moment\ Arm = 17.75\ ft.$$

Wind Load on Pole =
0.00256 x $(145)^2$ x 1.0 x 0.97 x 1.0 x 1.0 x 42.45 = **2,216 lbs**
Where:
k_z is based on h = 39'; k_z = 1.0
G_{RF} is based on h = 39'; G_{RF} = 0.97
C_f = 1.0 for wood and spun concrete poles
C_f = 1.6 for square concrete poles

This load must then be multiplied by the Load Factor, which for extreme wind equals 1.0 and the moment arm to obtain the Ground Line Moment (M_P) of the wind acting on the pole only.

M_P = Wind Load x Load Factor x Moment Arm.
M_P = 2,216 lbs x 1 x 17.75 ft. = 39,341 ft. lbs.

The strength of this pole, previously calculated is 173,900 ft.-lbs. The pole itself has used up 23% (39,341/173,900) of its capacity for 145 mph extreme wind. Subtract the wind load from the strength leaves 134,559 ft-lbs (173,900 – 39341) for conductors and other attachments.

Table 4.2.2-4 Lists the allowable groundline moments for various pole sizes.

Table 4.2.2-4 Allowable Ground Line Moments

Wood Poles (in earth)				
Pole Size	Setting Depth	Allowable Moment for Attachments at Designated Wind Speeds		
		105 mph	**130 mph**	**145 mph**
35/5	6	32178	28738	26324
35/4	6	42429	38656	36007
40/5	6.5	36936	31956	28460
40/4	6.5	48263	42812	38986
40/3	6.5	61567	55646	51489
40/2	6.5	76998	70607	66119
45/3	7	66363	58624	53190
45/2	7	86391	78000	72108
50/2	7	93535	82611	74941
55/2	7.5	99693	86174	76682
60/1	8	131634	113020	99951

Table 4.2.2-4 Allowable Ground Line Moments (cont.)

Square Concrete Poles (in earth)				
Pole Size	Setting Depth	Allowable Moment for Attachments at Designated Wind Speeds		
		105 mph	**130 mph**	**145 mph**
35/Type O	7	15426	11417	8602
35/SU	7.5	15323	10778	7588
35/III-G	9	48907	44275	41022
40/III-A	10	23777	17050	12327
40/III-G	9	56781	49950	45154
40/III-H	11.5	96450	88537	82981
40/12 KIP	13	191480	181610	174681
45/III-A	10	24142	14146	7127
45/III-G	9	62676	52592	45511
45/III-H	11.5	110053	98198	89874
45/12 KIP	13.5	222175	208520	198933
50/III-A	10	24111	10635	1173
50/III-G	9.5	67701	54539	45297
50/III-H	11.5	123164	107106	95831
50/12 KIP	13.5	252789	233067	219219
55/III-G	9.5	72176	55004	42947
55/III-H	12	133764	113283	98902
55/12 KIP	14	280155	254873	237121
60/III-H	12	144138	117993	99637
60/12 KIP	14	308835	276454	253719
65/III-H	12	149613	115197	91032

Spun Concrete Poles (in earth)				
Pole Size	Setting Depth	Allowable Moment for Attachments at Designated Wind Speeds		
		105 mph	**130 mph**	**145 mph**
50/4.7 KIP	11	153270	142277	134559
55'/4.7 KIP	12	167116	153482	143910
60'/5.0 KIP	12.5	190953	171477	157803
65'/5.0 KIP	13	202928	177845	160233
70'/5.0 KIP	13.5	214369	183392	161642

2. *Wind Loading on conductors.*

The wind loading on conductors is calculated in a similar method to the wind loading on the pole. The load in pounds per conductor uses Equation 4.2.2-2 with the appropriate factors for the attachment heights a shown in Table 4.2.2-2.

To calculate the wind load on the conductor:

a. Determine the wind region (105 mph, 130 mph, or 145 mph)
b. Calculate the attachment height to determine the k_z and G_{RF} (Table 4.2.2-2)
c. The Importance Factor (I) and the Force Coefficient (C_f) are both equal to 1 for conductors.
d. Calculate the area per foot of conductor
e. Calculate the wind load per foot of conductor
f. Calculate the total wind load on the conductor for the length of conductor exposed to the wind (Average of the Spans on either side of the pole).

Example:
Determine the wind load on a 170 foot length [(180'span + 160'span)/2] of 568.3 ACAR conductor that is attached at 30 feet above the ground in the 145 mph wind region.
From Table 4.2.2-2:

$K_z = 1.0$
$G_{RF} = 0.93$

Calculate the area per foot of conductor
Diameter = 0.879 inches

For a 1 foot length of conductor:
Projected Area.

$$A = 1(ft.)x\left[\frac{Conductor\ Diameter(inches)}{12(inches/ft)}\right]$$

$$A = 1(ft.)x\left[\frac{0.879(inches)}{12(inches/ft)}\right]$$

A = 0.073 Square Ft. for each foot of span length

The wind load in pounds per foot of span length (from Equation 4.2.2-2) is

$$Load\ in\ pounds = 0.00256 \times (Vmph)^2 \times k_z \times G_{RF} \times I \times C_f \times A(ft^2)$$

Load in pounds = $0.00256 \times (145)^2 \times 1 \times .93 \times 1 \times 1 \times .073$
Load = 3.667 pounds per foot

Total Load	=	Length of conductor x Load per foot of conductor
	=	170 x 3.667
Total Load	=	623.3 pounds

This is the load that the wind exerts on the conductor attached at 30 above ground. This load will have to be applied to the pole to determine if the pole has the strength to support the load.

The wind load per foot of conductor for the three wind regions can be found in Table 4.2.2-5, Table 4.2.2- 6 and Table 4.2.2-7.

3. ***Wind Loading on equipment.***
The wind loading on equipment is calculated in a similar method to the wind loading on the pole and the conductors. The load in pounds uses Equation 4.2.2-2 with the appropriate factors for the attachment heights a shown in Table 4.2.2-2 and the area of the equipment.

To calculate the wind load on the equipment:

a. Determine the wind region (105 mph, 130 mph, or 145 mph)
b. Calculate the attachment height to determine the k_z (Table 4.2.2-2)
(For equipment, use the top mounting hole of the equipment bracket.)
c. Use the height of the pole above ground to determine G_{RF} (Table 4.2.2-2)
d. The Importance Factor (I) is equal to 1.
e. The Force Coefficient (C_f) is equal to 1.0 for cylindrical equipment and 1.6 for rectangular equipment.
f. Calculate the area of the equipment
g. Calculate the wind load on the equipment

Example:
Determine the wind load on a 50 kVA transformer mounted at 28 feet on a pole that is 38 feet above the ground in the 145 mph wind region.

From Table 4.2.2-2:
K_z = 1.0 (Equipment ≤ 33' above ground)
G_{RF} = 0.97 (Equipment based on Pole height > 33' to 50' above ground)

$C_f = 1.0$
A = 4.44 square feet

The wind load in pounds from Equation 4.2.2-2 is

$$Load\ in\ pounds = 0.00256 \times (Vmph)^2 \times k_z \times G_{RF} \times I \times C_f \times A(ft^2)$$

Load in pounds = $0.00256 \times (145)^2 \times 1 \times .97 \times 1 \times 1 \times 4.44$
Load = 231.8 pounds

This is the load that the wind exerts on the transformer attached at 28 feet above ground. This load will have to be applied to the pole to determine if the pole has the strength to support the load.
The wind load on equipment for the three wind regions can be found in Table 4.2.2-5 (105 mph), Table 4.2.2- 6 (130 mph) and Table 4.2.2-7 (145 mph).

Table 4.2.2-5 Wind Force on Conductors & Equipment

Wind Speed = 105 mph
CONDUCTORS

		Force in pounds per foot Conductor Height Above Ground		
Conductor	Diameter	≤33'	>33' to 50'	>50' to 80'
568.3 MCM ACAR	0.879	1.923	2.001	2.134
3/0 AAAC	0.502	1.098	1.143	1.218
1/0 AAAC	0.398	0.871	0.906	0.966
#4 AAAC	0.250	0.547	0.569	0.607
3/0 TPX	1.238	2.708	2.819	3.005
1/0 TPX	1.026	2.244	2.336	2.490
6 DPX	0.496	1.085	1.129	1.204
CATV				
Feeder w/1/4"Msgnr	0.750	1.641	1.708	1.820
Trunk w/1/4"Msgnr	1.000	2.187	2.277	2.427
Telephone				
100 pr (24 GA BKMS) Self-Support	0.960	2.100	2.186	2.330
600 pr (24 GA BKMA w/3/8" Msgnr	2.295	5.020	5.225	5.571

Wind Speed = 105 mph
EQUIPMENT

		Pole Height in same range as Equipment Force in pounds at top mounting Bolt Height Above Ground			Pole height >33' to 50' Equipment Ht
Transformers	Sq. Ft.	≤33'	>33' to 50'	>50' to 80'	≤33'
25	3.75	108.0	112.9	118.1	102.7
50	4.44	127.8	133.7	139.9	121.6
75	4.81	138.5	144.9	151.5	131.7
100	6.55	188.6	197.3	206.3	179.3
167	10.83	311.8	326.1	341.1	296.5
Capacitors					
Switched (1)	19.91	573.2	599.6	627.1	545.1
Fixed (1)	16.89	486.2	508.6	532.0	462.4
Reclosers					
1 phase	4.00	115.2	120.5	126.0	109.5
3 phase (1)	16.89	486.2	508.6	532.0	462.4
Automation Switches					
Joslyn	8.89	255.9	267.7	280.0	243.4
Cooper	10.56	304.0	318.0	332.6	289.1
S&C	15.60	449.1	469.8	491.4	427.1
Riser - PVC U-Guard		Force in pounds per foot of riser Height Above Ground			
2" U-Guard	0.19	5.4	5.6	5.9	5.1
5" U-Guard	0.46	12.8	13.8	14.4	13.2

(1) The 1.6 C_f factor for rectangular shape is included in the Area shown for Capacitors and 3 Phase Recloser

Table 4.2.2-6 Wind Force on Conductors & Equipment

Wind Speed = 130 mph
CONDUCTORS

		Force in pounds per foot Conductor Height Above Ground		
Conductor	Diameter	≤33'	>33' to 50'	>50' to 80'
568.3 MCM ACAR	0.879	2.947	3.068	3.270
3/0 AAAC	0.502	1.683	1.752	1.868
1/0 AAAC	0.398	1.334	1.389	1.481
#4 AAAC	0.250	0.838	0.872	0.930
3/0 TPX	1.238	4.151	4.321	4.606
1/0 TPX	1.026	3.440	3.581	3.817
6 DPX	0.496	1.663	1.731	1.845
CATV				
Feeder w/1/4"Msgnr	0.750	2.515	2.617	2.791
Trunk w/1/4"Msgnr	1.000	3.353	3.490	3.721
Telephone				
100 pr (24 GA BKMS) Self-Support	0.960	3.219	3.350	3.572
600 pr (24 GA BKMA w/3/8" Msgnr	2.295	7.695	8.009	8.539

Wind Speed = 130 mph
EQUIPMENT

		Pole Height in same range as Equipment Force in pounds at top mounting Bolt Height Above Ground			Pole height >33' to 50' Equipment Ht
Transformers	Sq. Ft.	≤33'	>33' to 50'	>50' to 80'	≤33'
25	3.75	165.5	173.1	181.1	157.4
50	4.44	195.9	205.0	214.4	186.3
75	4.81	212.3	222.0	232.2	201.9
100	6.55	289.0	302.4	316.3	274.9
167	10.83	477.9	499.9	522.9	454.5
Capacitors					
Switched (1)	19.91	878.6	919.1	961.3	835.5
Fixed (1)	16.89	745.3	779.7	815.5	708.8
Reclosers					
1 phase	4.00	176.5	184.7	193.1	167.9
3 phase (1)	16.89	745.3	779.7	815.5	708.8
Automation Switches					
Joslyn	8.89	392.3	410.4	429.2	373.1
Cooper	10.56	466.0	487.5	509.9	443.2
S&C	15.60	688.4	720.1	753.2	654.7
Riser - PVC U-Guard		Force in pounds per foot of riser Height Above Ground			
2" U-Guard	0.19	8.3	8.7	9.1	7.9
5" U-Guard	0.46	20.2	21.2	22.1	19.2

(1) The 1.6 C_f factor for rectangular shape is included in the Area shown for Capacitors and 3 Phase Recloser

Table 4.2.2-7 Wind Force on Conductors & Equipment

Wind Speed = 145 mph
CONDUCTORS

		Force in pounds per foot Conductor Height Above Ground		
Conductor	Diameter	≤33'	>33' to 50'	>50' to 80'
568.3 MCM ACAR	0.879	3.667	3.816	4.069
3/0 AAAC	0.502	2.094	2.180	2.324
1/0 AAAC	0.398	1.660	1.728	1.842
#4 AAAC	0.250	1.043	1.085	1.157
3/0 TPX	1.238	5.164	5.375	5.731
1/0 TPX	1.026	4.280	4.455	4.749
6 DPX	0.496	2.069	2.154	2.296
CATV				
Feeder w/1/4"Msgnr	0.750	3.129	3.256	3.472
Trunk w/1/4"Msgnr	1.000	4.171	4.342	4.629
Telephone				
100 pr (24 GA BKMS) Self-Support	0.960	4.005	4.168	4.444
600 pr (24 GA BKMA w/3/8" Msgnr	2.295	9.573	9.964	10.623

Wind Speed = 145 mph
EQUIPMENT

		Pole Height in same range as Equipment Force in pounds at top mounting Bolt Height Above Ground			Pole height >33' to 50' Equipment Ht
Transformers	Sq. Ft.	≤33'	>33' to 50'	>50' to 80'	≤33'
25	3.750	205.9	215.4	225.3	195.8
50	4.440	243.8	255.0	266.7	231.8
75	4.810	264.1	276.2	288.9	251.1
100	6.550	359.6	376.2	393.4	342.0
167	10.830	594.6	622.0	650.5	565.4
Capacitors					
Switched (1)	19.910	1093.1	1143.4	1195.9	1039.5
Fixed (1)	16.890	927.3	970.0	1014.5	881.8
Reclosers					
1 phase	4.000	219.6	229.7	240.3	208.8
3 phase (1)	16.890	927.3	970.0	1014.5	881.8
Automation Switches					
Joslyn	8.890	488.1	510.6	534.0	464.1
Cooper	10.560	579.7	606.5	634.3	551.3
S&C	15.600	856.4	895.9	937.1	814.5
Riser - PVC U-Guard		Force in pounds per foot of riser Height Above Ground			
2" U-Guard	0.188	10.3	10.8	11.3	9.8
5" U-Guard	0.458	25.2	26.3	27.5	23.9

(1) The 1.6 C_f factor for rectangular shape is included in the Area shown for Capacitors and 3 Phase Recloser

The methodology to determine if a pole has the strength for a specific design or to determine the maximum span distance a specific size pole can support for framing, is shown in the examples below. The calculations are based on using the new tables for extreme wind loading. Note that the ground line is now the point used for the calculations rather than the "fixity" point.

Example:

Conductor: 3-568.3 MCM ACAR and #3/0 AAAC - Neutral
Framing: Modified Vertical and single phase transformer
Transformer: 50 kVA
CATV: Trunk
Telephone: 1-600 pair, 24 gauge, BKMA
Average Span Length = 150 feet
Attachment heights must be calculated using the framing identified and the pole setting depths as shown in table 4.2.2-4.

Case I: Determine if a 45'/2 wood pole is strong enough for this design.

Calculate the moments on the pole.

CONDUCTORS	Number of Conductors		Wind Load Per Ft. (Table 4.2.2-7'		Avg. Span Length		Height Above Ground		MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	150	x	39.00	=	22324
568.3	1	x	3.816	x	150	x	36.60	=	20950
568.3	1	x	3.816	x	150	x	34.60	=	19805
Neut., Sec., St Lt									
3/0	1	x	2.094	x	150	x	29.4	=	9235
CATV - PROPOSED									
Trunk	1	x	4.171	x	150	x	23.6	=	14765
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	150	x	22.6	=	32452
					TOTAL MOMENT DUE TO CONDUCTOR			=	119531
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		29.9	=	6931
					TOTAL MOMENT DUE TO EQUIPMENT			=	6931 ft.-lb.
							TOTAL ALL MOMENTS	=	**126462 ft.-lb.**

From Table 4.2.2-4, the allowable moment for attachments to a 45'/2 wood pole in a 145 mph wind region is 72,108 ft-lbs. A 45'/2 wood pole cannot be used.

Case II: Determine if a 50'/III-H square concrete pole is strong enough for this design

Table 4.2.2-4 shows a revised setting depth for square concrete poles. The new setting depth is generally 5 feet deeper than previous. A 50'/III-H square concrete pole is set 11.5 feet deep.

Re-calculate the moments based on attachment heights.

CONDUCTORS	Number of Conductors	x	Wind Load Per Ft. (Table 4.2.2-7)	x	Avg. Span Length	x	Height Above Ground	=	MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	150	x	39.50	=	22610
568.3	1	x	3.816	x	150	x	37.08	=	21225
568.3	1	x	3.816	x	150	x	35.08	=	20080
Neut., Sec., St Lt									
3/0	1	x	2.094	x	150	x	29.92	=	9398
CATV - PROPOSED									
Trunk	1	x	4.171	x	150	x	24.08	=	15066
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	150	x	23.08	=	33142
							TOTAL MOMENT DUE TO CONDUCTOR	=	121519
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		30.42	=	7051
							TOTAL MOMENT DUE TO EQUIPMENT	=	7051 ft.-lb.
							TOTAL ALL MOMENTS	=	**128571 ft.-lb.**

From Table 4.2.2-4, the allowable moment for attachments to a 50'/III-H square concrete pole in a 145 mph wind region is 95,831 ft-lbs. A 50'/III-H square concrete pole cannot be used.

Case III: Determine if a 50'/4.7 KIP spun concrete pole is strong enough for this design.

Table 4.2.2-4 shows the setting depths for spun concrete poles. A 50'/4.7 KIP spun concrete pole is set 11 feet deep.

Re-calculate the moments based on attachment heights.

CONDUCTORS	Number of Conductors		Wind Load Per Ft. (Table 4.2.2-7'		Avg. Span Length		Height Above Ground		MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	150	x	40.00	=	22896
568.3	1	x	3.816	x	150	x	37.58	=	21511
568.3	1	x	3.816	x	150	x	35.58	=	20366
Neut., Sec., St Lt									
3/0	1	x	2.094	x	150	x	30.42	=	9555
CATV - PROPOSED									
Trunk	1	x	4.171	x	150	x	24.58	=	15378
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	150	x	23.58	=	33860
							TOTAL MOMENT DUE TO CONDUCTOR	=	123566
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		30.92	=	7167
							TOTAL MOMENT DUE TO EQUIPMENT	=	7167 ft.-lb.
							TOTAL ALL MOMENTS	=	**130733 ft.-lb.**

From Table 4.2.2-4, the allowable moment for attachments to a 50'/4.7 KIP spun concrete pole in a 145 mph wind region is 134,559 ft-lbs. A 50'/4.7 KIP spun concrete pole can be used.

The maximum span distance for each of the poles above can be determined.

Determine the moment due to 1 foot of conductor moments

Subtract the moment due to the transformer from the total allowable moment

Divide the remaining allowable moment by the total 1 foot conductor moments.

CONDUCTORS	Number of Conductors		Wind Load Per Ft. (Table 4.2.2-7)		Avg. Span Length		Height Above Ground		MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	1	x	39.00	=	149
568.3	1	x	3.816	x	1	x	36.60	=	140
568.3	1	x	3.816	x	1	x	34.60	=	132
Neut., Sec., St Lt									
3/0	1	x	2.094	x	1	x	29.4	=	62
CATV - PROPOSED									
Trunk	1	x	4.171	x	1	x	23.6	=	98
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	1	x	22.6	=	216
							TOTAL MOMENT DUE TO CONDUCTOR	=	797
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		29.9	=	6931
							TOTAL MOMENT DUE TO EQUIPMENT	=	6931 ft.-lb.
							TOTAL ALL MOMENTS	=	**7728 ft.-lb.**

Maximum Allowable moment on 45'/2 pole =	72108
Transformer Moment	6931
Available for conductors	65177
Conductor Moments per foot of span =	797
Maximum span distance =	**82 ft.**

CONDUCTORS	Number of Conductors		Wind Load Per Ft. (Table 4.2.2-7)		Avg. Span Length		Height Above Ground		MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	1	x	39.50	=	151
568.3	1	x	3.816	x	1	x	37.08	=	141
568.3	1	x	3.816	x	1	x	35.08	=	134
Neut., Sec., St Lt									
3/0	1	x	2.094	x	1	x	29.92	=	63
CATV - PROPOSED									
Trunk	1	x	4.171	x	1	x	24.08	=	100
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	1	x	23.08	=	221
							TOTAL MOMENT DUE TO CONDUCTOR	=	810
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		30.42	=	7051
							TOTAL MOMENT DUE TO EQUIPMENT	=	7051 ft.-lb.
							TOTAL ALL MOMENTS	=	**7861 ft.-lb.**

Maximum Allowable moment on 50/III-H pole =	95831
Transformer Moment	7051
Available for conductors	88780
Conductor Moments per foot of span =	810
Maximum span distance =	**110 ft.**

CONDUCTORS	Number of Conductors		Wind Load Per Ft. (Table 4.2.2-7)		Avg. Span Length		Height Above Ground		MOMENT (ft.-lb.)
Primary									
568.3	1	x	3.816	x	1	x	40.00	=	153
568.3	1	x	3.816	x	1	x	37.58	=	143
568.3	1	x	3.816	x	1	x	35.58	=	136
Neut., Sec., St Lt									
3/0	1	x	2.094	x	1	x	30.42	=	64
CATV - PROPOSED									
Trunk	1	x	4.171	x	1	x	24.58	=	103
TELEPHONE									
600 pr 24 Ga BKMA	1	x	9.573	x	1	x	23.58	=	226
					TOTAL MOMENT DUE TO CONDUCTOR			=	824
EQUIPMENT			Wind Load Force in lbs				Height Above Ground	=	MOMENT (ft.-lb.)
TRANSFORMERS	(SEE TABLE FOR INSTRUCTIONS)								
1 Phase	50 kva		231.8		x		30.92	=	7167
					TOTAL MOMENT DUE TO EQUIPMENT			=	7167 ft.-lb.
							TOTAL ALL MOMENTS	=	**7991 ft.-lb.**

Maximum Allowable moment on 50'/4.7 KIP po	134559
Transformer Moment	7167
Available for conductors	127392
Conductor Moments per foot of span =	824
Maximum span distance =	**155 ft.**

Note: In some cases, the limiting factor for maximum span distance is not the wind loading, but the required clearance above the ground and above other conductors or cables. The attachment heights on the pole must be determined for all facilities at the appropriate operating temperatures and sags as defined by the NESC.

C. *Storm Guying*

One method to overcome the overload on a pole due to transverse wind load is to add storm guys. Storm guys are installed in pairs(back to back) – one on each side of the pole perpendicular to the pole line. These guys should typically be installed 6 inches to 2 feet below the primary attachments.

Calculating the size of the guy wire is very much like calculating a deadend guy.

1. Calculate the transverse wind load on the pole, conductors and all attachments and equipment.
2. The load is then used to size the guy wire based on the load, the attachment height and lead length.
3. A final check should be made to verify that the strength of the pole above the guy attachment is adequate.

Using the example of Case I above for the 45'/2 pole, calculate the size of the storm guys and anchors required for extreme wind loading.

1. Transverse wind loads:

Pole	=	Wind load on pole
Primary	=	Wind Load per ft x span length x number of conductors
Neutral	=	Wind Load per ft x span length
CATV	=	Wind Load per ft x span length
Telephone	=	Wind Load per ft x span length
Transformer	=	Wind Load

Load on Pole	=							1713 pounds
Primary	=	3.816	x	170	x	3	=	1946 pounds
Neutral	=	2.094	x	170	x	1	=	356 pounds
CATV	=	4.171	x	170	x	1	=	709 pounds
Telephone	=	9.573	x	170	x	1	=	1627 pounds
Transformer	=	231.8	x	1			=	232 pounds
				Total Load			=	6583 pounds

2. Determine the guy wire size and anchor size required for this installation.

   To calculate the tension in the guy wire use the equation below

Equation 4.2.2-7 $$T_{DG} = \frac{T_{TWL}}{L} x \sqrt{H_G^{\,2} + L^2}$$

Where:

T_{DG} = *Tension in down guy*
T_{TWL} = *Transverse Wind Load*
L = *The down guy Lead length*
H_G = *The attachment Height of the down guy*

Use the total transverse wind load for the load to be guyed with the guy attached 6 inches below C phase primary (34.1') and a lead length of 20 feet.

$$T_{DG} = \frac{6583}{20}\sqrt{(34.1)^2 + (20)^2}$$

T_{DG} = 13,013 Pounds

For extreme wind loading, the required strength of the guy wire is equal to the rated breaking strength of the guy wire x 0.9.

Table 4.2.2-11 Storm Guy Strength

Guy Size	Rated Breaking Strength (RBS)	Allowable Guy Tension .9 X RBS
5/16	11200	10080
7/16	20800	18720
9/16	33700	30330

For this example, a 7/16" guy will be installed in each direction perpendicular to the pole line. Use the tension in the down guy to select the appropriate anchor. In this case, a 10" screw anchor will do the job.

3. One final check is to be sure that the pole length above the storm guy attachment has sufficient strength to support the load above it. Basically, this is just like calculating the strength of the total pole but now the "ground line" is at the storm guy attachment height and all of the facilities above this point will create a moment here.

   With the top of the pole at 38' and the down guy at 34.1 feet, the length of pole exposed to the wind is now 38-34.1 = 3.9 ft.

   Use equation 4.2.2-3 to determine the strength of this section of pole.

The circumference at 3.9 feet down from the top of the pole = 26.5 inches

$M_r = 0.000264 \times (8{,}000) \times (26.5)^3 \times 0.75 = 29{,}478$ ft.-lbs.

Use equation 4.2.2-4 to find the area of this section of pole

$$A = 3.9\left(\frac{25+26.5}{2}\right)\left(\frac{1}{12}''\right) = 2.66 sqft$$

Use equation 4.2.2-5 to find the center of the area of this section of pole

$$Height\ of\ center\ of\ area, H_{CA} = \frac{3.9(8.44+2(7.96))}{3(8.44+7.96)} = 1.93\,ft$$

Use equation 4.2.2-2 to find the wind load on this section of pole

Load in pounds = 0.00256 x (145)² x1.0 x0.97 x 1 x 1x 2.66= 139 pounds

Use equation 4.2.2-6 to determine the moment due to the wind load on this section of the pole at the guy attachment point

Moment = 1.93 x 139 = 269 ft lbs

Determine the moment created by the wind load on the conductors

Primary	=	3.816	x	170	x	1	x	4.9	=	3179 Ft-Lbs
	=	3.816	x	170	x	1	x	2.5	=	1622 Ft-Lbs
	=	3.816	x	170	x	1	x	0.5	=	324 Ft-Lbs
										5125 Ft-Lbs

Total Moment = 269 + 5125 = 5393 Ft-Lbs

This load is well under the strength calculated above and the design using storm guys will meet requirements.

4.2.3 Pole Framing

A. Slack Span Construction

Slack span construction is employed where it is impractical to follow conventional guying practices. The proper application is a pull-off from either a tangent pole or a properly guyed deadend pole to another properly guyed deadend pole. The intent is not to slack span to a stand alone (self-support) pole unless that pole has been properly sized for this application. Improper use of slack span construction can cause a pole to bow or lean which then can cause more slack in the conductors. More slack in the conductors can result in improper clearances and increased potential for conductors to make contact with each other.

The initial sag when installing slack spans limits the per conductor tension to 50 pounds.

Slack Span design criteria:

1. Vertical construction is preferred for two and three phase installations. Maintain 36" separation between phases at the poles.
2. Limit the span lengths to

Table 4.2.2-12 Slack Span Length & Sag

SLACK SPAN		
CONDUCTOR	MAXIMUM LENGTH	INITIAL SAG
568.3 ACAR	50'	3'-7"
3/0 AAAC	75'	2'-9"
1/0 AAAC	95'	2'-10"

3. Use class 2 poles minimum.
4. If crossarm construction is used, use the 9 foot heavy duty wood crossarms or the 8'6" steel crossarm for added horizontal spacing.

B. ***Targeted Poles***

There are many poles in the distribution system identified as Targeted Poles. These poles are deemed critical by virtue of the equipment mounted on them or their importance to maintaining the system. As stated in The Distribution Design Guide "The following list comprises what will be considered targeted poles. When installing and/or replacing an accessible targeted pole, use a III-H concrete pole or a spun concrete pole for spans greater than 300 feet. If the pole is inaccessible, use a Class 2 pole, or consider relocating the equipment to an accessible concrete pole."

Targeted Pole List

"01" Feeder Switch Poles (first pole outside the substation)
Automated Feeder Switches
Interstate/Highway Crossings
Capacitor Banks
Multiple Primary Risers
3 Phase Reclosers
Aerial Auto Transformers
Multiple Circuits
3 phase Transformer Banks (3-100 kVA and larger)
Regulators
Primary Meter

The targeted pole also should meet the design criteria for wind loading as previously shown.

C. ***Distribution Design Guidelines***

The Storm Secure Organization has developed a set of guidelines for Distribution Designers to use when designing or maintaining distribution facilities. The designer can go online to see the most current version.

III. PROCEDURES

III.A. PROCEDURES FOR JOINT USERS

FPL and Incumbent Local Exchange Carriers (ILEC) explore the benefits of joint use and share the cost of pole ownership.

New Construction

1. Before facilities are designed and put into place, the FPL engineer and the ILEC engineer discuss the needs of both companies and the requirements for design by either the detail plans filed with the FPSC or the existing joint use agreement.
2. The joint use agreement for each company dictates which company sets the new pole(s)
3. If FPL is building the pole line, a notice of build is sent by FPL to all CATV companies and telecommunication carriers with attachment agreements in the area.
4. If FPL is building the new pole line CIAC will be collected for the increased size and strength required to accommodate the facilities of all parties requesting attachments.

There are times when the ILEC determines they would like to attach to a pole they previously were not attached to or they wish to modify their facilities, which would in turn increase the loading on a pole

Existing Poles

1. If the ILEC is increasing load on the pole, it is imperative for the ILEC engineer to learn if the pole has been hardened or if the pole now has stronger windloading requirements due to detail plans filed with the FPSC. This is true if the pole is owned by FPL or the ILEC. Discussion with the FPL engineer will help determine the design criteria of the pole.
2. If the new attachment would compromise the loading standard, the ILEC engineer may request make-ready from the FPL engineer to accommodate their attachments. A contribution will be charged in accordance with our agreement.

III.B. PROCEDURES FOR THIRD PARTIES (CATV AND TELECOMMUNICATION CARRIERS (non-ILECs))

1) **APPLY** for permit.

- When making new attachments or overlashing to existing attachments where the resulting bundle is heavier than the existing attachment or has an increased diameter over that of the existing attachment, apply for permit for attachments to FPL poles. Apply for a permit for Non-FPL poles that require FPL make-ready.

- Remember that permits are not granted for attachments to poles that are exclusively part of an FPL street lighting system.

- The attachment permit is for CATV cables, wires and supporting hardware only, not for power supplies, amplifiers or similar equipment.

- Create appropriate permit application package(s):

  - Non-make ready

  - Make ready (requires design, cost approval, invoice, payment, and construction of FPL work order prior to FPL permit approval)

  - Major rebuild or upgrade

- Review permit application package for accuracy and completeness to avoid rejection.

- Submit complete permit package.

2) **RECEIVE** approved permit. (Exhibit "A")

3) **CONSTRUCT** attachments.

- You must have an approved permit.
(Exhibit "A")

- You must complete construction within 60 days of permit approval (180 days if Major rebuild permit), or permit will automatically expire, and you will need to re-apply.

- Build facilities as designed in approved permit package.

- Conform to FPL requirements (clearances, tagging, bonding, etc.) and NESC standards.

- Field review facilities for compliance upon completion of construction.

4) NOTIFY of construction completion. (Exhibit "B")

- Send notice monthly (provided there have been attachments/removals during that month). Remember to include all routine attachments to drop or lift poles.

- Notice (Exhibit "B") must be sent to permit process contractor (Alpine).

- Notice (Exhibit "B") must be sent within 30 days after construction of the attachments is complete.

III.C. PROCEDURES FOR GOVERNMENTAL ATTACHMENTS

Attachment Permits are required for:

- New attachments to FPL poles
- Overlashings of existing attachments to FPL poles where the resulting bundle is heavier than the existing attachment or has an increased diameter over that of the existing attachment
- Major rebuilds or upgrades
- Attachments to non-FPL poles that require FPL make-ready

The attachment permit is for Licensee cables, wires and supporting hardware only, not for power supplies, amplifiers or similar equipment.

Wireline attachments are not allowed to poles exclusively a part of an FPL street lighting system.

Permits requiring FPL make-ready will not be approved until FPL design, payment by the Applicant, and construction is completed by FPL.

PERMIT APPLICATION PROCESS

1. Field Survey - Identify ownership and pole size and existing attachments, conductor sizes, and span lengths.
2. Complete the Pole & Midspan Measurement Form
3. Ensure that all minimum clearances will be maintained.
4. Calculate windloading.
5. Complete the "Attachment and Application and Permit Exhibit A".
6. Assemble permit package (which may or may not include request for make ready.
7. Review completed package for accuracy
8. Submit package to FPL for approval
9. Once approved make attachments
10. When complete return Exhibit B to FPL

III.D. PROCEDURES FOR ATTACHMENTS TO TRANSMISSION POLES

Application Requirements
All applications for attachment to transmission poles require complete structural calculations. Applicant shall demonstrate that the poles can withstand the additional proposed mechanical and environmental loads. Calculations shall be provided with GT-STRUDL output forms, with non-linear analysis results, signed and sealed by a Professional Engineer – Structural, licensed in the State of Florida.

Application Costs
The cost associated with reviewing the application calculations will be the responsibility of the applicant. Review of calculations for approval is performed by FPL Transmission at a cost of $96 per manhour (regardless of final approval or disapproval of the request). A deposit of $2,000 dollars, payable to FPL, is required for quantities of up to 50 poles.

Application Process
Submit completed application to FPL Representative (same as for distribution attachments). Your representative will review the application for completeness. Completed applications will be forwarded to FPL's Transmission Projects Group for review.

1.0 DESIGN CRITERIA

When more than one code applies, the more stringent criteria shall govern.

1.1 CLEARANCES

Any overhead cable installation shall comply with FPL 2007 NESC Basic Clearances for Overhead Transmission Lines, the National Electric Safety Code (NESC)-2007 or other governmental agency codes.

1.2 DESIGN LOADS

1.2.1 POLE DESIGN

Design loads shall meet the specifications defined in the National Electric Safety Code (NESC)-2007, the American Society of Civil Engineer (ASCE) latest edition "Minimum Design Loads for Buildings and Other Structures" and ASCE Manuals #74, "Guidelines for Electrical Transmission Line Structural Loading".

STEEL TRANSMISION STRUCTURES
Designs shall meet the specifications defined in the ASCE/SEI 48-05 "Design of Steel Transmission Pole Structures" latest edition, and ASCE Standard latest edition, "Design of Latticed Steel Transmission Structures".

CONCRETE TRANSMISSION POLES
Designs shall meet the specification defined in the ASCE-PCI "Guide for the Design of Prestressed Concrete Pole".

WOOD TRANSMISSION POLES
Designs shall meet the specification defined in the IEEE Standard 751 "Trial-Use Design Guide for Wood Transmission Structures".

1.2.2 WEATHER RELATED LOADS
Transmission poles are required to resist the weather-related loads (Extreme Wind and Ice/Wind). The applied wind load cases that need to be considered for transmission structures from ALL angles are defined as follows:

Under Combined Ice/Wind loads (NESC Section 250 B) FPL service territory is classified as the "Light Loading District".

Under Extreme Wind Loads (NESC Section 250 C) ASCE latest edition "Minimum Design Loads for buildings and Other Structures" and ASCE Manuals #74, "Guidelines for Electrical Transmission Line Structural Loading" are the basis of this control criteria.

Under Serviceability Requirements (FPL Policy for Concrete Pole)

45 mph wind load is considered as the minimum wind load applied for this zero-tension condition, which is only applied to prestressed concrete poles. The calculation of the wind pressure also follows the requirements of ASCE latest edition "Minimum Design Loads for Buildings and Other Structures" and ASCE latest edition Manuals #74, "Guidelines for Electrical Transmission Line Structural Loading".

Basic Wind Speeds (ANS/ASCE latest edition). Refer to enclosed drawings showing Basic Wind Speeds(within FPL Service Territory. Map file name: wind_cont_FL-1.g12 created 10-22-02 attached.

1.2.3 OSHA REQUIREMENTS

This project shall be designed to meet all Occupations Safety and Health Administration (OSHA) rules and regulations.

2.0 PERMIT PACKAGE

A permit application shall consist of two (2) complete packages in the following order:

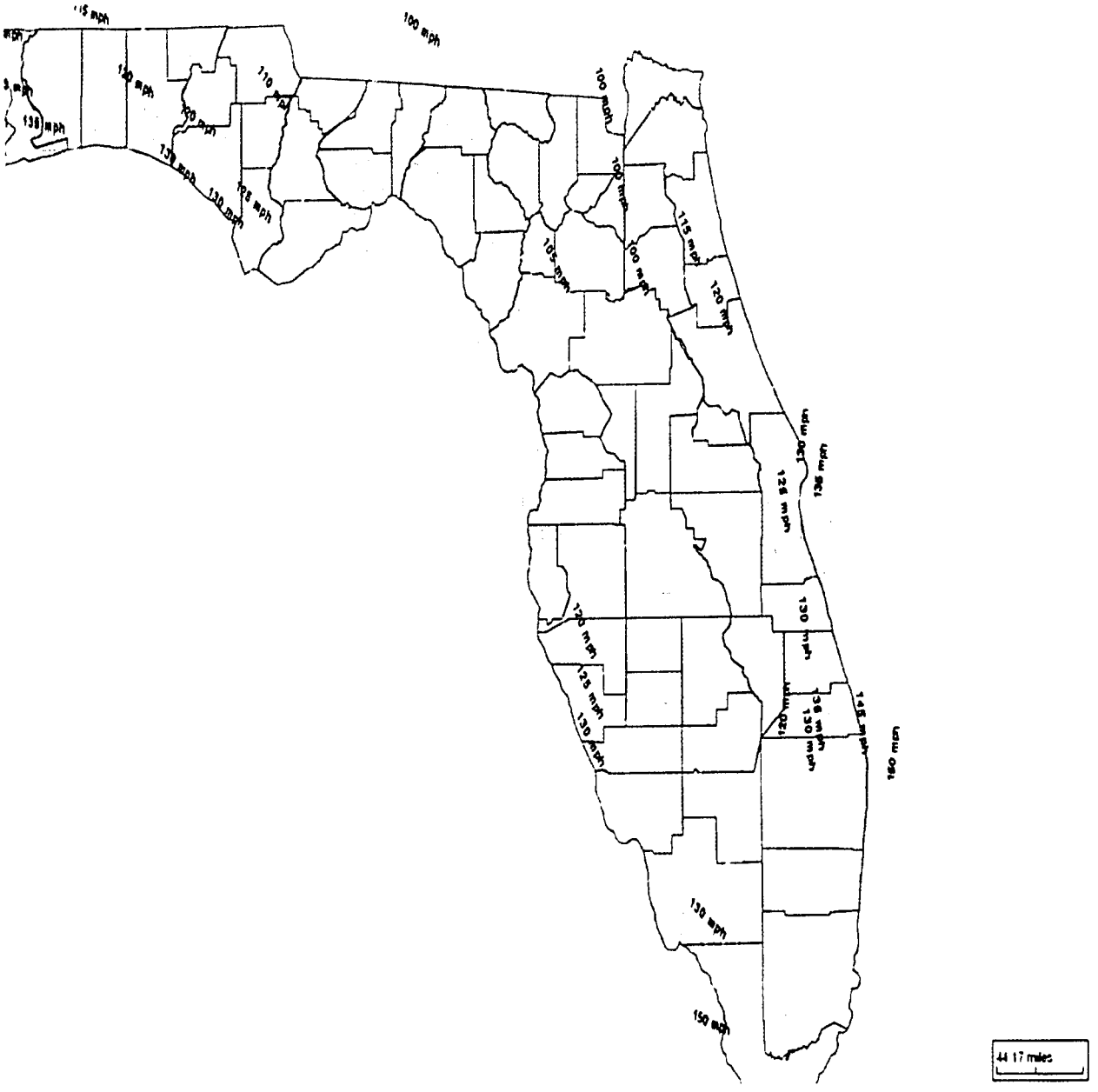
1) Payment for Permit (payable to FPL)
2) Original, signed Exhibit "A" (front and back)
3) Calculations (signed and sealed)
4) Field Notes
5) Pictures of all affected poles, with corresponding pole identification numbers (photographs or jpeg files)
6) Licensee maps (plan/profile) showing route, spans, pole heights, and the Licensee facilities proposed for installation
7) Copy of the FPL Primary Map, with the affected area highlighted

3.0 APPROVAL / DISAPPROVAL

Upon review of the permit application, a response stating approval or disapproval will be communicated by the FPL – Transmission Projects Department

FLORIDA WIND ZONES-2002

To Be Used For Transmission Attachment Permits



BELLSOUTH

BellSouth Telecommunications, Inc.

R. E. Christian, Jr.
State Manager – Joint Use/Right of Way

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April 23, 2007

Mr. R. L. Valdez
Senior Regulatory Analyst
Florida Power & Light Company
9250 West Flagler Street
Miami, Florida 33174,

Subject: Florida Power and Light Company (FPL) 2007-2009 Hardening Plans

Dear Mr. Valdez:

In response to your March 22 request for BellSouth Telecommunications, Inc., d/b/a AT&T Florida (AT&T Florida) to review and provide input to FPL's 2007-2009 Hardening Plans, attached is our initial response. Due to the scope of information provided to AT&T Florida and the timeframe in which AT&T Florida had to respond, AT&T Florida reserves its right to supplement this response.

AT&T Florida thanks FPL for the opportunity to review the hardening plans, for the opportunity to meet and discuss the various issues. AT&T Florida looks forward to continuing a dialogue with FPL regarding its hardening efforts so that the most accurate cost information and feedback can be provided to the Florida Public Service Commission prior to its review of the Hardening Plan.

Sincerely,

Earl Christian

State Manager – Joint Use/Right of Way

Attachment

BellSouth Telecommunications, Inc. d/b/a AT&T Florida's Initial Response to FPL's Proposed Electric Infrastructure Hardening Plan for 2007 – 2009

BellSouth Telecommunications, Inc. d/b/a AT&T Florida ("AT&T Florida") provides the following initial response to FPL's Electric Infrastructure Hardening Plan forwarded to AT&T Florida on March 22, 2007 ("Hardening Plan"). Due to the scope of information provided to AT&T Florida and the timeframe in which AT&T Florida had to respond, AT&T Florida reserves its right to supplement this response.

FPL's Hardening Plan

FPL plans to harden its infrastructure during 2007 through 2009 through three primary methods by: building to Extreme Wind Loading criteria ("EWL"), engaging in "incremental hardening," and implementing new design guidelines and processes for new construction and major planned work.

2007 Deployment

1. EWL:

In 2007, FPL plans to use EWL to harden twenty-eight (28) Critical Infrastructure Facilities (CIF) which are served by thirty-four (34) primary circuits. The costs that AT&T Florida potentially faces in connection with this aspect of FPL's Hardening Plan can be broken down into the following major categories:

- Costs to transfer facilities from an existing pole to a replacement pole
- Costs to replace cable in instances where FPL moves a pole line such that transfers of existing cable are not feasible
- Contribution costs FPL may seek from AT&T Florida for the replacement poles
- Increased pole rental rates

With regard to the first two items, AT&T Florida cannot accurately estimate costs because AT&T Florida does not know how many of its attachments will be impacted and the type of work that would need to be performed on those attachments. The level of detail regarding the proposed hardening projects that AT&T would need to perform this analysis is not contained in FPL's Hardening Plan. While FPL did provide more detailed information on many of the CIF projects to AT&T Florida on Tuesday, April 17, 2007, AT&T Florida has not had sufficient time to analyze this information before FPL's April 23, 2007 deadline for a response. Accordingly, AT&T Florida reserves its right to supplement this response and to request additional information from FPL if needed.

With this caveat, to facilitate the exchange of information contemplated by Rule 25-6.0342(6), however, AT&T Florida estimates that the transfer of facilities and the replacement of cable owned by AT&T Florida in connection with FPL's proposed hardening of 28 CIFs in 2007 would cost approximately $4.3 million. In developing this

rough estimate, AT&T Florida assumed that it would have aerial facilities on 18 of the 34 circuits to be hardened, translating into 3,600 spans of AT&T Florida aerial facilities. AT&T Florida further assumed that approximately 20% of the 3,600 spans (720 spans) would involve replacing cable at an estimated cost of $4,000 per span. AT&T Florida estimated that the remaining 80% (2,880 spans) would involve transfer work at an estimated cost of $500 per span.

AT&T Florida may face additional costs if FPL seeks contribution toward the cost of new poles. In Section III(A) of its Proposed Hardening Plan entitled "Procedures for Joint Users," FPL states that Contribution In Aid of Construction (CIAC) will be collected "for the increased size and strength required to accommodate the facilities of all parties requesting attachments" and that contribution will be charged in accordance with existing joint use agreements. (*See Hardening Plan* at 47.) In the informational meeting held by FPL on April 12, 2007, FPL indicated that it was still evaluating the contribution issue. Without more specific information on this issue, AT&T Florida remains concerned of the potential for unjustified cost shifting under its existing joint use agreement with FPL.[1] AT&T Florida reserves the right to supplement this response pending further clarification of this issue.

Lastly, hardening of the electric infrastructure will likely result in increased pole rental rates. Because AT&T Florida cannot estimate the potential cost impact of increased rates until rate negotiations are initiated, AT&T Florida reserves the right to supplement its response on this issue.

2. Incremental Hardening

FPL proposes to address thirty-four (34) community projects, which FPL defines as feeders that serve community needs (e.g., grocery stores, gas stations), through incremental hardening. Again, AT&T Florida cannot accurately estimate how many of its attachments will be impacted and the type of work that would need to be performed on those attachments until it receives and analyzes more detailed information on these proposed projects. Assuming that it will have aerial facilities at ten (10) of these sites comprised of ten (10) poles per site, AT&T estimates an additional $80,000 in cable replacement costs and $40,000 in transfer costs in connection with FPL's proposed incremental hardening plans for 2007. Again, this is a rough estimate based on limited information.

3. New Design Guidelines

While AT&T Florida has communicated to FPL that AT&T Florida will voluntarily increase the class size of wood poles in its distribution system under certain circumstances, AT&T Florida objects to any references in FPL's *Addendum to FPL's*

[1] The existing joint use agreement between FPL and AT&T Florida addresses the responsibility for pole replacement costs, as well as transfer costs. AT&T Florida will attempt to resolve these issues relative to hardening projects with FPL prior to the Florida Public Service Commission's review of FPL's Hardening Plan so that more accurate cost information can be provided and considered.

Permit Application Process Manuals, Attachment Agreements and Joint Use Agreements that implies that AT&T Florida's poles are governed by FPL's design criteria. Additionally, AT&T Florida would like to have further discussions with FPL regarding how the *Addendum* will impact current joint use operating procedures. AT&T Florida reserves the right to provide further input on the *Addendum* following this dialogue.

2008 & 2009 Deployment

AT&T Florida is not able to estimate the potential cost impact of FPL's Hardening Plan for 2008 and 2009. FPL has not yet identified the locations to be hardened or the method by which the hardening will be accomplished (i.e. EWL vs. incremental hardening). AT&T Florida requests that FPL provide these detailed plans as soon as they are developed so that AT&T Florida can provide the input contemplated by Rule 25-6.0342(6). AT&T Florida reserves the right to comment on these plans once they are finalized.

Benefits of Hardening Plan

The most significant benefit AT&T Florida may recognize from implementation of the Hardening Plan would be from the potential reduction of commercial power outages. As a customer of FPL, AT&T Florida relies on electric service to power its remote terminals. AT&T Florida cannot quantify this potential benefit as it would be difficult to determine how many remote terminals are served by the circuits that will be hardened.

Conclusion

AT&T Florida's input is limited by the scope of the information provided and the timeframe in which AT&T Florida had to respond. AT&T Florida looks forward to continuing a dialogue with FPL regarding its hardening efforts so that the most accurate cost information and feedback can be provided to the Florida Public Service Commission prior to its review of the Hardening Plan.

LAWYERS

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April 23, 2007

Via Electronic and First Class Mail

Bob Valdez
Florida Power & Light Company
Regulatory Affairs Room No. 6047
9250 West Flagler Street
Miami, Florida 33174

Re: FPL 2007-2009 Storm Hardening Plans

Dear Mr. Valdez:

I am writing on behalf of the Florida Cable Telecommunications Association (FCTA) concerning the Florida Power and Light Company Electric Infrastructure Storm Hardening Plan ("Plan") dated March 22, 2007. Florida Administrative Code, Rule 25-6.0342(6) requires pole owning utilities, such as FPL, to seek input from and attempt in good faith to accommodate concerns raised by other entities with existing agreements to share the use of its electric facilities. In your cover letter accompanying the Plan, you asked that FCTA member cable operators provide input concerning the Plan by no later than today, April 23, 2007. In an email dated April 9, 2007, FCTA asked for additional information as well as additional time to review the data and compile cost data for input, but FPL responded that it unable to grant FCTA's request due to the deadline imposed by the Public Service Commission (PSC) of May 7, 2007 for submission of plans to the PSC.

As a preliminary matter, FCTA appreciates the substantial responsibility that FPL has as a pole owner and respects the management decisions FPL has reached in its Plan. The information presented by FPL in the Plan and in additional materials sent via compact disc on April 16, 2007 address substantial portions of FPL's plant to which cable operators are attached and cover a large geographic area. As you know, Comcast is the largest cable operator in FPL's service territory. Comcast has distributed the information to its field representatives in numerous geographic areas for their analysis and review. These representatives have initiated a review of the proposed plans and the impact that such Plan will have on its attachments. However, given

the volume of information presented, it will be some time before Comcast will have a true sense of the impact that FPL's Plan will have on its attachments and related activities.

Moreover, while a significant amount of information was included in the plans, additional information was not included that would greatly aid Comcast in providing constructive information to FPL about the costs and benefits of such plans, including the effect on reducing storm restoration costs and customer outages. For example, FPL: provided information only for some example communities not all, only included information about its own attachments to the poles and not those of third party attachers, fails to explain the precise work that will be necessary for third party attachers (i.e., it may state that the pole needs to be replaced but does not further indicate whether the attachments will be transferred to the new pole or re-routed, does not indicate why a particular action is being taken (i.e., whether the pole is being replaced because it is overloaded or rotten), does not indicate the extent to which its storm hardening efforts will delay construction of new third party attachments, and does not give an estimate of the costs for the proposed work or what costs it expects to shift to attaching entities.

We realize that the Plan cannot be extremely detailed as illustrated by the wide ranging estimate of $40 million to $70 million in anticipatory hardening related costs that FPL projects for 2007 alone. FPL has stated that it does not yet know what portion of these costs will be billed to cable operators or other third party attachers. We agree that many of the details of costs and benefits of storm hardening must be resolved after the May 7, 2007 filing deadline. However, without this type of information, third party attachers cannot discern the possible cost to them associated with the Plan.

Moreover, as discussed at the meeting held April 13, 2007, third party attachers initially were not consulted in determining what would constitute critical infrastructure and targeted poles. As a result, it does not appear that poles carrying main line cable operator feeders were included. Cable operators now provide life-line services to Florida residents, including valuable communications infrastructure that is relied upon in storm restoration and 911 services. Accordingly, it is possible that certain poles carrying cable facilities should be added to the list of critical infrastructure and targeted poles. FPL stated that it was willing to consider recommendations from cable operators and other third party attachers concerning proposed additions to FPL's list of critical infrastructure and targeted poles. Again, this issue will likely be resolved after the May 7, 2007 filing deadline.

Comcast understands that it may have been difficult for FPL, in the timeframes established by the PSC, to have anticipated and provided all of the detail necessary for third party attachers to give meaningful input. However, given the broad scope of information addressed in the Plan and the limited amount of cost-related detail provided, it would be counter-productive to limit third party input to a one-time response. Instead, FCTA suggests that this plan be only the starting point for discussion between pole owners and third party attachers. FCTA

members believe it would be extremely beneficial to all parties to the proceeding and to Florida consumers to hold regularly scheduled workshops to ensure that as specific plans are implemented, third party attachers have an opportunity to participate in the decision making process. Such workshops would also allow third party attachers an opportunity to propose some additional facilities that they believe should be included as critical infrastructure and/or targeted poles. These workshops have worked well in the past to promote good working relationships and good project results, and should be beneficial in working through the storm hardening issues.

While FCTA was not able to provide precise costing data in response to FPL's Plan for the reasons set forth above, FCTA nevertheless has the following comments on the general features of the Plan, which FCTA believes should be treated as initial comments in an ongoing dialogue between cable attachers and FPL.

Electric Infrastructure Storm Hardening Plan

- Page 7, Hardening Existing Facilities. This section explains the process of capturing detailed information at each pole location of a storm hardening project. If the detailed information can be shared with cable operator personnel for the purpose of designing cable operator work associated with the project, much duplication of field work can be eliminated and good results can be expedited.
- Page 7, Examples of Hardening Options: Storm Guying. FCTA agrees that storm guying where practical is a very cost effective means of strengthening poles up to and including extreme wind standards. We also believe that more emphasis on identifying lines or portions of lines which should be strengthened by storm guying will be a good addition to the FPL plan. In addition, the storm guying effects of crossing power and communications lines should be left in the wind loading calculations for poles being hardened. Both crossing lines and lateral pull-off lines whose pull is balanced by down guy wires serve the same purpose as storm guys on existing poles. Ignoring the effects of such lines on wind loading substantially increases the cost of individual projects.
- Some areas of proposed storm hardening of critical infrastructure circuits are shielded to a great extent by tall trees above the height of the distribution lines while others are shielded by tall buildings. The shielding effects of trees and buildings have not been considered by FPL. Clearly, if the trees or buildings do not blow down they shield the line from high winds. If they do blow down they take the storm hardened poles with them. Trees and buildings should be considered, at least in some circumstances. Inclusion of this additional information in the Plan would be helpful.
- It would be very helpful if FPL could provide the number of poles it proposes to change out and the proposed type of replacement pole (i.e., wood, concrete, steel) for each of the categories identified by FPL – i.e., Critical Infrastructure, Community Project, Critical Poles. Gulf Power recently provided this level of detail in its third draft of its Plan at page 10, which is attached hereto for your convenience.

- It would be helpful to include in the Plan additional information concerning storm restoration coordination.

FPL Attachment Standards and Procedures Addendum

Section I: Safety

- Page 4. To the extent that FPL adopts requirements they should be reasonable implementations of applicable codes.
- Also on page 4 in the 5th paragraph please explain what is meant by "At no time may the CATV worker encroach upon the electric supply space." It would be best to state that communications workers must at all times comply with applicable NESC and OSHA work rules.
- Also on page 4 in the 6th paragraph concerning RF emitting devices, please provide for at least 48 hours advance notice to the device owner before disconnecting power except in emergencies. Moreover, most wireless (RF emitting) devices attached by cable operators are line powered through the existing cable system and do not require FPL meters. Would this still require a termination switch?

Section II: Standards

- Overlashing a fiber optic cable to an existing cable should not require a permit, notification of FPL only. It is our understanding based upon conversations with FPL that in fact FPL only intends to require approval for overlashing where diameter size of existing facility will be increased. The Plan should so state.
- Page 8, Clearances of communications cables to FPL. At dimension letter B, add an asterisk and refer to NESC Rule 238D Exception which allows reduction of the 12" clearance to 3" if the loop is covered.
- Page 10, Clarification of installation of poles in private easements. If FPL places pole in private easement do third party attachers require a separate easement or is the language of the FPL easement agreement include cable operator?
- At dimension letter F the new requirement in the 2007 NESC is 40". See NESC Rule 239G1. (The change was to Exception 1). The FPL 3" requirement should be referenced for grandfathering of facilities installed prior to 2007.
- At dimension letter K, the 12" separation between cable messengers became effective in NESC 2002 with a requirement for 4" separation between cables in the span under the specified conditions. Please reference NESC Rule 235H 1. and 2.
- At dimension letter L, the recognition of the NESC exception allowing 30" separation is good. Please add reference to NESC Rule 235.2.b.(1)(a). Exception 1. This rule reduces

the required clearance between the neutral and cable to 12 inches in the span, not 30." The rule also applies to separation between fiber optic cable (supply) and communications cables in the communication space.

- Section II.C. Windload Criteria and Calculations. It would be helpful if this section explained criteria for determining which party is responsible for pole overloading, and how costs for any necessary work to bring pole into compliance will be allocated.
- Section III.B. Procedures for Third Parties (CATV and Telecommunication Carriers). It would be informative if the Addendum included timeframes for the pole makeready process including but not limited to the permit process and completion of work specified by Make Ready engineering approval, so that attachers would have a sense of whether storm hardening activities will impact speed to market.

In addition, there are certain provisions included in the Plan that do not appear to be related to storm hardening but instead appear to be standard terms and conditions of attachment. For example, Section III.B. provides that when overlashing to existing attachments or increasing wire diameter, third parties (CATV and non-ILEC telecommunications carriers) must obtain a permit.[1] Similarly, the same section implies that power supplies, amplifiers and similar equipment will be subject to separate permitting requirements, and thus additional rent. However, permitting is required for rental rate purposes and the rates, terms and conditions of attachment are not before the PSC in this proceeding. Florida Administrative Code, Rule 25-6.0342(8). Accordingly, FCTA believes that these provisions should not be included in the Plan.

FCTA commends FPL on its reliance on the NESC requirements to a great degree for the engineering guidelines for separation between electric and communications attachments. FCTA believes that the suggested changes are consistent with FPL's intentions when these standards were established before recent revisions of the NESC and that most, if not all, the suggestions will be acceptable to FPL. Moreover, FCTA members do see a significant benefit from several of the ten initiatives being deployed by FPL including its three year cycle for vegetation management and eight year inspection plan. Ensuring that wires are not endangered by tree limbs and that poles are not rotten or overloaded, should significantly assist in efforts to prevent storm outages and in storm restoration. Rotten poles in particular are a serious problem in high wind situations because they can cause a cascading effect.

FCTA members would like to work with FPL to ensure that distribution pole infrastructure is hardened to withstand stronger winds and to improve storm restoration. To that end, FCTA members strongly believe that continued open lines of communication and workshops in details of storm hardening plans are provided and input from third parties is solicited extending over the course of the Plan's implementation would significantly contribute

[1] In a subsequent conversation it was explained that in fact permits would only be required where the diameter of wire is increased, as is currently the case.

to state's efforts to ensure the availability of power and communications services in extreme weather situations.

Please feel free to contact me if you have any questions or comments related to these initial responsive comments. We look forward to an ongoing dialogue and working together to hardening FPL's infrastructure in a manner that is beneficial to all involved.

Sincerely,

Maria T. Browne

ATTACHMENT

pumping/treatment plants and major sewage treatment plants. The planned projects are shown in the table below.

2007 - 2008	District	Critical Load	Total Main Miles	Estimated Number of Pole Changeouts
	Western	Fuel Depot	1.38	46
	Central	Fuel Depot	2.83	100
	Eastern	I-10 Crossings	N.A.	16
TOTAL ALL				162
2008 - 2009	District	Critical Load	Total Main Miles	Estimated Number of Pole Changeouts
	Western	Hospital	3.56	125
	Central	I-10 Crossings	N.A.	14
TOTAL ALL				139

2009 - 2010	District	Critical Load	Total Main Miles	Estimated Number of Pole Changeouts
	Central	Hospital	2.14	75
	Central	Hospital	1.08	38
	Western	I-10 Crossings	N.A.	56
TOTAL ALL				169
Three Year Plan Totals	Company			470

The estimated poles which may be subject to replacement based on the above and possible impact from Joint-Use Assessments are as follows:

Year	Extreme Wind Loading	Joint-Use Assessments	Total Estimated Poles Impacted
2007-2008	162	500	662
2008-2009	139	500	639
2009-2010	169	500	669

9.1.2 Transmission

Gulf Power transmission utilizes overload and strength factors greater than or equal to those required in Section 26 of the National Electric Safety Code. Gulf's loading criteria for new line design is derived from Section 25 of the National Electric Safety Code. These design criteria are used on all new installation and complete rebuild projects throughout the Gulf Power service territory.

Voice | Data | Internet | Wireless | Entertainment

EMBARQ™

Embarq Corporation
Mailstop FLTLHO0201
1313 Blair Stone Road
Tallahassee, FL 32301
EMBARQ.com

May 2, 2007

Mr. Bill Walker
Florida Power & Light Company
215 South Monroe Street, Suite 810
Tallahassee, FL 32301-1859

In RE: Florida Power & Light Storm Hardening Plan

Dear Mr. Valdez:

Embarq has reviewed the Florida Power & Light Electric Infrastructure Storm Hardening Plan dated March 22, 2007 for the years 2007 through 2009 and which was discussed in the April 23, 2007 meeting in Miami. While the plan provided some specifics, e.g. the intent to harden the facilities serving Naples Community Hospital and Lee Memorial Hospital in 2007, most of the plan is non-specific. Therefore, in order to respond regarding the impact of this plan on Embarq, certain assumptions have been made. If additional details are provided regarding the plan, Embarq will review this response and provide a more targeted estimation of the costs and benefits.

Based on the assumption from the plan that FP&L will harden approximately 20% of their poles in the first three years of this plan, Embarq applied that 20% factor times the number of FP&L poles with Embarq attachments in order to arrive at an estimate of the direct and immediate costs to Embarq. Using the formula in the current Joint Use Agreement between FP&L and Embarq and the costs of transferring attachments as well as the costs of existing and new joint use poles, the estimated cost to Embarq is $13,967,200.00 in years 2007 through 2009 of the plan. If 50% of FP&L's poles are hardened within ten years, the cost to Embarq would be almost $35,000,000.00 for the ten years (2007 - 2016). Another potential cost which may not be as immediate nor as direct would be increases in pole attachment fees charged by FP&L.

FP&L's Hardening Plan may benefit Embarq by reducing the amount of damage to our facilities, thereby reducing the number of customer outages and reducing the time to restore service. The extent of these benefits will not be known until the next storm and they cannot be readily quantified in dollar savings; however, Embarq does not believe that it is likely these benefits will outweigh the costs.

Sincerely,

Sandra A. Khazraee

cc: Mr. Bob Valdez, FP&L
Mr. Henry Bowlin, Embarq
Mr. Bill Radel, Embarq

Sandra A. Khazraee
REGULATORY MANAGER
LAW AND EXTERNAL AFFAIRS
Voice (850) 847-0173
Fax (850) 878 0777

Bob Valdez
05/02/2007 06:13 PM

To: "Dave Bromley" <Dave_Bromley@fpl.com>
cc:
Subject: Fw: Fwd: 2007 Hardening projects

----- Original Message -----
From: "Denise Yoezle" [DYOEZLE@hollywoodfl.org]
Sent: 05/02/2007 04:33 PM
To: Bob Valdez
Subject: Fwd: 2007 Hardening projects

Hi Bob,
Is there another person I can contact for this information?

Denise Yoezle
Operations Manager
Streets & Highways
City of Hollywood
954-967-4526

>>> Denise Yoezle 4/30/2007 9:37 AM >>>
Hi Bob,
I see on your March 22, 2007 correspondence that Memorial Regional Hospital is on the list of 28 Critical Facilities to be hardened. Do you have a schedule for completion of the work at this facility?

Also, of the 34 Community Projects, 11 are located in Broward County. Are any of these located in the City of Hollywood?

We have reviewed the criteria and have no comments, other than to welcome all such efforts for a speedy and effective post-storm recovery.

Regards,

Denise Yoezle
Operations Manager
Streets & Highways

City of Hollywood
954-967-4526

Tony Newbold
04/18/2007 11:27 AM

To: Bob Valdez/RAD/FPL@FPL
cc:
Subject: Fw: Hardening Plans

"Paul W. Milelli" <pmilelli@psd.co.palm-beach.fl.us>
04/11/2007 12:01 PM

To bob_valdex@fpl.com
cc Greg_Cope@fpl.com, Tony_Newbold@fpl.com, "Charles Tear" <ctear@psd.co.palm-beach.fl.us>
Subject Hardening Plans

Mr. Valdez:

After reviewing the plans provided to Palm Beach County, we offer the following comments:

1. The 2007 Deployment Plan identified four "Acute Care Facilities" in Palm Beach County for "EWL" activities. While we support any activities that will harden the electical grid leading to all of our facilities, we question how the hospitals were selected, in particular, Good Samaritan Hospital and the Veteran's Administration Hospital.

Good Samaritan Hospital is within the County's Hurricane Vulnerability and Surge Zones and must evacuate in the event of a landfalling hurricane. St. Mary's Hospital (it's sister facility) rests on higher elevation, is one of our County's Trauma Centers, lies outside of the evacuation zones, and is the reciepient of Good Samaritan's patients. We would believe that our hospitals outside of the surge and vulnerability zones would take priority over those within the hurricane zones.

The V.A. Hospital, while outside of the surge and vulnerability zones, does not accept patients from the general public. Similarly, we would believe that hospitals serving the general public would take priority.

2. The 2007 Deployment Plan identified ten (10) "Community Projects" for "EWL" activities. While we support any actitivities that will harden the electrical grid leading to all of our critical infrastructure, we question how FPL selected the listed Feeder's. Of the over 400 Feeders within Palm Beach County serving critical infrastructure, we have identified the top 20% of the feeders for priority restoration immediately following a hurricane. None of the ten feeders identified in the 2007 Deployment Plan is within our top 20%. We have worked with our account executives from FPL to create the list (please see attached) and we would suggest that the Deployment Plan recognize this list as a generator of FPL's Community Project hardening.

The 2007 Deployment Plan speaks to the 2008 and 2009 deployment plans and the critical facilities and community projects selected for upgrading during those years. We would suggest that FPL partner with our County Emergency Management Division staff to review, and possibly modify the "Targeted Facilities" lists for 2008 and 2009.

Again, we support FPL's aggressive hardening plans. We strongly suggest and encourage FPL's consideration of partnering with the County in selecting future feeders and facilities for the electrical grid hardening.

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

Paul W. Milelli, Director
Department of Public Safety
Palm Beach County
20 South Military Trail
West Palm Beach, FL 33415

561-712-6470 (Office)
561-712-6490 (Fax)

PBTop20PercentFdrs04022007.xls

Barbara Gilbreath
04/30/2007 09:22 AM

To: Bob Valdez/RAD/FPL@FPL
cc: timothy young
Subject: FiberNet Cost Estimates

Bob,

Attached is a summary of costs associated with the hardening of the circuits supplied on the CD. The total cost to FN is estimated at $15,584.00.

Should you require additional information, please advise.

Barbara Gilbreath
Manager-OSP Engineering and Construction
305-552-2879

FN Cost Summary.x

FPL FiberNet Cost - 2007 FPL Network Hardening

FPL Circuit Number	FPL FN Cost
404032	$2,381
803835	$1,800
804535	$1,200
101539	$3,303
501137	$6,900
	$15,584

- Mr. Henry Bowlin
  Process Specialist II
  Embarq, Florida, Inc.
  MS: LAPKA0241-2191
  555 Lake Border Drive
  Apopka, Fl 32703-5815

- Ms. Maria Browne Esquire
  1919 Pennsylvania Ave NW
  Suite 200
  Washington D.C. 20006

- Mr. Cody Harrison
  Sabin, Bermant & Gould LLP
  Four Times Square
  New York, New York 10036

- Mr. Douglas C. Nelson
  233 Peachtree Street N.E.
  Suite 2200
  Atlanta, GA. 30303

- Mr. Christopher McDonald
  Comcast
  Direct or State Government Affairs-Florida
  300 West Pensacola Street
  Tallahassee, Florida 32301

- Mr. Steve R. Lindsay
  Staff Consultant-Network Engineering
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  8800 Adamo Drive
  Mail Code: FLTP0937
  Tampa, Fl 33601

- Mr. R.E. Christian, Jr.
  State Manager-Joint Use/Right of Way
  Bell South Telecommunications, Inc.
  301 W. Bay Street, 15hh1
  Jacksonville, Fl 32202

- Mr. Gary Cary
  Windstream Florida, Inc.
  206 White Ave.
  Live Oak, Fl 326064

- Mr. Jimmy Albritton
  Northeast Florida Telephone Company
  130 North 4th Street
  Macclenny, Fl 32063-0485

- Ms. MaryAnn Holt
  Indiantown Telephone Systems
  15925 S.W. Warfield Blvd.
  Indiantown, Fl 33456

- Mr. Terry Ray
  Vice President and CFO
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- Ms. Carla Hicks
  e.spire/ACSI/Fiberlight
  6230 Shiloh Rd. Suite 210
  Alpharetta, GA. 30005

- Mr. John Hunt
  FDN Communications
  2301 Lucien Way, Suite 200
  Maitland, Fl 32751

- Mr. Sheldon S. Jordan
  FPL Fibernet LLC
  9250 West Flagler Street
  Miami, Fl 333174

- Ms. Kristin Johnson, President
  Hotwire Communications, LLC
  300 E. Lancaster Avenue, Suite 208
  Wynnewood, PA 19803

- Ms. Tricia Brekenridge
  KMC Telecom
  994 Explorer Blvd.
  Huntsville, Al 35801

- Mr. Steve Mako
  Level 3 Communications
  2121 West Prospect Rd.
  Tamarac, Fl 33309

- Mr. Jay Malinowski
  Level 3 Communications
  5907 F Hampton Oaks Pkwy
  Tampa, Fl 33610

- Pat Fernandez
  Level 3 Communications
  1800 Pembroke Dr.
  Orlando, Fl 32810

- Mr. Michael Hughes
  Lightstream Tech
  3550 West Waters Ave.
  Tampa, fl 33614

- Mr. Virgil Springer
  MCI
  6929 N. Lakewood Ave.
  Tulsa, OK 74117

- Mr. Joe Faber
  PT Wireless
  444 Hight Street, Suite 400
  Palo Alto, CA 94301

- Mr. Gary Hunt
  Qwest Communications Corporation
  700 West Mineral Avenue
  UT H27.19
  Littleton, Colorado 80120

- Mr. Ken Kirkland
  SETEL
  1165 South 6 Street
  Macclenny, Fl 32063

- Mr. Paul T. Bradshaw
  Sunesys, LLC
  202 Titus Av
  Warrington, PA 19876

- Mr. Tom Terwilliger
  S.F.M. & T., INC.
  15398 S.W. 153 St.
  Miami, Fl 33187

- Mr. Thoomas J. Farrell
  TAPCO
  23170 Harborview Road
  Charlotte Harbor, Fl 33980

- TCG South Florida
  Attn: V.P. of Operations
  1001 West Cypress Creek Rd.
  Suite #209
  Fort Lauderdale, Fl 33309

- Ms. Janet Livengood
  Telcov
  DDI Plaza Two
  500 Thomas Street, Suite 400
  Bridgeville, PA 1507-2838

- Ms. Loren Rosenthal
  Tier 3 Communications
  2235 First Street
  Suite 217
  Fort Myers, Florida 33901

- Carlie Ancor
  U.S. Metropolitan Telecom, LLC
  2407 Production Circle
  Bonita Springs, Fl 34135

- Ms. Leslie Strickland-Corporate Accounting
  XO Communications
  11111 Sunset Hills Road
  Reston, VA 20190

- City of Cocoa Beach
  Mr. Thiel, I.T. Director
  2 South Orlando Avenue
  Cocoa Beach, Fl 32931

- City of Stuart
  Attn: City Clerk
  121 S.W. Flagler Avenue
  Stuart, Fl 34944

- City of Miami Beach
  Attn: City Clerk
  1700 Convention Center Drive
  Miami Beach, Florida 33139

- Mr. Jack Yaghdjian
  WLRN
  172 N.E. 15 Street
  Miami, Fl 33132

- City of South Daytona
  Attn: City Clerk
  1672 S. Ridgewood ave.
  South Daytona, Fl 32119

- Collier County
  Attn: Board of Commissioners
  3301 E. Tamiami Trail
  Naples, Fl 34112

- Myakka River State Park
  13207 S.R. 72
  Sarasota, Fl 34241

- Sarasota County
  Chairman of Board of Commissioners
  1001 Sarasota Center Blvd.
  Sarasota, Fl 34240

- City of Palm Beach Gardens
  Attn: City Clerk
  10500 North Military Trail
  Palm Beach Gardens, Fl 33410

- Town of Juno beach
  Attn: City Clerk
  340 Ocean Drive
  Juno Beach, Fl 33408

- Village of Wellington
  Attn: City Clerk
  14000 Greenbriar Blvd.
  Wellington, Fl 33414

- Seminole County
  Attn: Board of Commissioners
  1101 East First Street Sanford, Fl 32771

- City of Hollywood
  Attn: City Clerk
  26000 Hollywood Boulevard
  Hollywood, Florida 33020-4807

- City of Vero Beach
  Attn: City Clerk
  1053 20th Place
  Vero Beach, Fl 32960

- Volusia County
  Attn: Board of Commissioners
  123 W. Indiana Ave.
  Deland, Fl 327320

- Broward County
  Attn: Board of Commissioners
  2300 West Commercial Boulevard
  Fort Lauderdale, Florida 33309

- West Palm Beach
  Attn: Board of Commissioners
  200 2nd Street, Fifth Floor
  West Palm Beach, Fl 33401

- City of Boca Raton
  Attn: City Clerk
  201 W. Palmetto Park Rd.
  Boca Raton, Fl 33432

- Brevard County
  Attn: Board of Commissioners
  2725 Judge Fran Jamieson Way
  Suite A-204
  Viera, Fl 32940

- City of Cape Canaveral
  Attn: Cit Clerk
  105 Polk Avenue
  Cape Canaveral, Fl 32930

- Charlotte County
  Attn: Board of Commissioners
  18500 Murdock Circle
  Port Charlotte, Fl 33948

- Indian River County
  Attn: Board of Commissioners
  1028 20th Place
  Vero Beach, Fl 32960

- Manatee County
  Attn: Board of Commissioners
  1112 Manatee Avenue West
  Bradenton, Fl 34205

- Martin County
  Attn: Board of Commissioners
  2401 SE Monterey Road
  Stuart, Fl 34996-3322

- City of Melbourne
  Attn: City Clerk
  900 E. Strawbridge Ave.
  Melbourne, Fl 32901

- Palm Beach County
  Attn: Board of Commissioners
  301 N. Olive Avenue
  West Palm Beach, Fl 33401

- City of Port St. Lucie
  City Clerk's Office
  121 SW Port St. Lucie Blvd.
  1st Floor, Building "A", Room 187
  Port St. Lucie, Fl 34984-5099

- City of Rockledge
  Attn: City Clerk
  1600 Huntington Lane
  Rockledge, Fl 32955-2660

- St. Lucie County
  Attn: Board of Commissioners
  2300 Virginia Avenue
  Fort Pierce, Fl 34982

- State of Florid, Department of Transportation
  Ms. Ruth Yanks
  FDOT Utility Section
  3400 W Commercial Blvd
  Fort Lauderdale, Fl 33309

- Town of Lake Park
  Attn: City Clerk
  535 Park Avenue
  Lake Park, Fl 33403

- Hendry County
  Attn: Board of Commissioners
  25 E. Hickpoochee Ave.
  Labelle, Florida 33935

- City of Deltona
  Attn: City Clerk
  2345 Providence Boulevard
  Deltona, Fl 32725

- City of Fort Myers
  City Clerk's Office
  2200 Second Street
  Fort Myers, Florida 33902

- City of Lauderdale Lakes
  Attn: City Clerk
  4300 NW 36th Street
  Lauderdale Lakes, Fl 33319

- City of Coral Springs
  Attn: City Attorney
  9551 W. Sample Road
  Coral Springs, Fl 33065

- City of Boynton Beach
  City Clerk's Office
  100 E. Boynton Beach Blvd.
  Boynton Beach, Fl 33435-3838

- City of Delray Beach
  Assistant City Manager
  100 NW 1st Ave.
  Delray Beach, Fl 33444

- City of West Melbourne
  City Attorney
  2285 Minton Road
  West Melbourne, Fl 32904-4928

- Town of Indialantic by the Sea
  Attn: City Clerk
  100 N Andres Avenue
  Fort Lauderdale, Fl 33301

- City of Fort Lauderdale
  Attn: City Clerk
  100 N Andrews Avenue
  Fort Lauderdale, Fl 33301

- Columbia County
  Attn: Board of Commissioners
  607 NW Quinten St.
  Lake City, Fl 32055

- City of Miami
  Attn: City Clerk
  3500 Pan American Drive
  Miami, Fl 33133

- City of Riviera Beach
  Attn: City Clerk
  600 West Blue Heron Blvd.
  Rivera Beach, Fl 33404

- City of Pompano Beach
  Attn: City Clerk
  100 West Atlantic, Boulevard
  Pompano Beach, Florida 33060

- Mr. Rick Scheller
  Advanced Cable Communications
  12409 NW 35 Street
  Coral Springs, Fl 33065

- Mr. Dave Floberg
  Atlantic Broadband
  1681 Kennedy Causeway
  North Bay Village, Fl 33141

- Mr. Darrell Larid
  Communication Services
  17774 NW US HWY 441
  High Springs, Fl 32643

- Mr. Gary English
  Florida Cable
  23505 SR 40
  Astor, Fl 32102

- Nextel South Corp.
  Attn: Legal Services
  851 Trafalgar Court suite 300E
  Maitland, Florida 32751

- Mr. Tim Thompson, Regional Vice President
  Nextel South Corp.
  Field Engineering and Operations
  6575 the Corners Parkway
  Norcross, GA 30092

- Nextel South Corp.
  Attn: Contracts Manager
  2001 Edmund Halley Dr.
  Reston, VA 20191-3436

- NEXT G NETWORKS, INC.
  Attn: Contracts Administrator
  2216 O'Toole Avenues
  San Jose, CA 95131

- Ms. Rosanne Gervasi Esquire
  Office of the General Counsel
  Florida Public Service Commission
  2540 Shumard Oak Boulevard
  Tallahassee, Florida 32339-0850

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI EXHIBIT 21
COMPANY FPL (Direct)
WITNESS Manuel B. Miranda (MBM-2)
DATE 10/02 & 03/07

2008 and 2009 CIF Projects

Fdr	County	Facility Type	Facility Name
300964	Baker	Acute Care	Ed Fraser Memorial Hospital
201632	Brevard	Acute Care	Palm Bay Community Hospital
200335	Brevard	Acute Care	Parrish Medical Center
203433	Brevard	Acute Care	Sebastian Hospital
203535	Brevard	Acute Care	Wuesthoff Medical Center - Melbourne
200431	Brevard	Acute Care	Wuesthoff Medical Center - Rockledge
203131	Brevard	Acute Care	Wuesthoff Medical Center - Rockledge
703934	Broward	Acute Care	Coral Springs Medical Center
703238	Broward	Acute Care	Florida Medical Center
702435	Broward	Acute Care	Hollywood Medical Center
701934	Broward	Acute Care	Holy Cross Hospital
706366	Broward	Acute Care	Memorial Hospital Miramar
702035	Broward	Acute Care	Memorial Hospital Pembroke
704762	Broward	Acute Care	Memorial Hospital West
706166	Broward	Acute Care	Memorial Hospital West
700231	Broward	Acute Care	Memorial Regional Hospital
701032	Broward	Acute Care	North Broward Medical Center
706531	Broward	Acute Care	North Ridge Medical Center
702236	Broward	Acute Care	Northwest Medical Center
701631	Broward	Acute Care	Plantation General Hospital
704564	Broward	Acute Care	Unviersity Hospital
501538	Charlotte	Acute Care	Charlotte Regional Medical Center
502061	Charlotte	Acute Care	Fawcett Memorial Hospital/Peace River Regional Medical Center
506663	Collier	Acute Care	Cleveland Clinic - Collier County
506762	Collier	Acute Care	Naples Community Hospital
507761	Collier	Acute Care	Physicians Regional Medical Center
301138	Columbia	Acute Care	Lake City Medical Center
808168	Dade	Acute Care	Baptist Health Data Center
804332	Dade	Acute Care	Baptist Hospital
805031	Dade	Acute Care	Doctor's Hospital
803636	Dade	Acute Care	Hialeah Hospital
807432	Dade	Acute Care	Kendall Regional Medical Center
807434	Dade	Acute Care	Kendall Regional Medical Center
801737	Dade	Acute Care	Kindred Hospital
802436	Dade	Acute Care	Larkin Community Hospital
805235	Dade	Acute Care	Mercy Hospital
801732	Dade	Acute Care	Miami Children's Hospital
806931	Dade	Acute Care	Miami Children's Hospital
806935	Dade	Acute Care	Miami Children's Hospital
807039	Dade	Acute Care	Palm Springs General Hospital
800533	Dade	Acute Care	Pan American Hospital
808931	Dade	Acute Care	Westchester General Hospital
501435	De Soto	Acute Care	DeSoto Memorial Hospital
101462	Flagler	Acute Care	Florida Hospital Flagler
405763	Indian River	Acute Care	Sebastian Hospital
506165	Lee	Acute Care	Gulf Coast Hospital
507661	Lee	Acute Care	Health Park Medical Center
501768	Lee	Acute Care	Shell Point Nursing Pavilion
505461	Lee	Acute Care	Southwest Florida Regional Medical Center
404939	Martin	Acute Care	Martin Memorial Hospital South
401138	Martin	Acute Care	Martin Memorial Medical Center
401633	Okeechobee	Acute Care	Raulerson Hospital
402832	Palm Beach	Acute Care	A G Holley State Hospital
403235	Palm Beach	Acute Care	Boca Raton Community Hospital
405337	Palm Beach	Acute Care	Columbia Hospital
409862	Palm Beach	Acute Care	Delray Medical Center
400934	Palm Beach	Acute Care	Glades General Hospital
402836	Palm Beach	Acute Care	JFK Medical Center

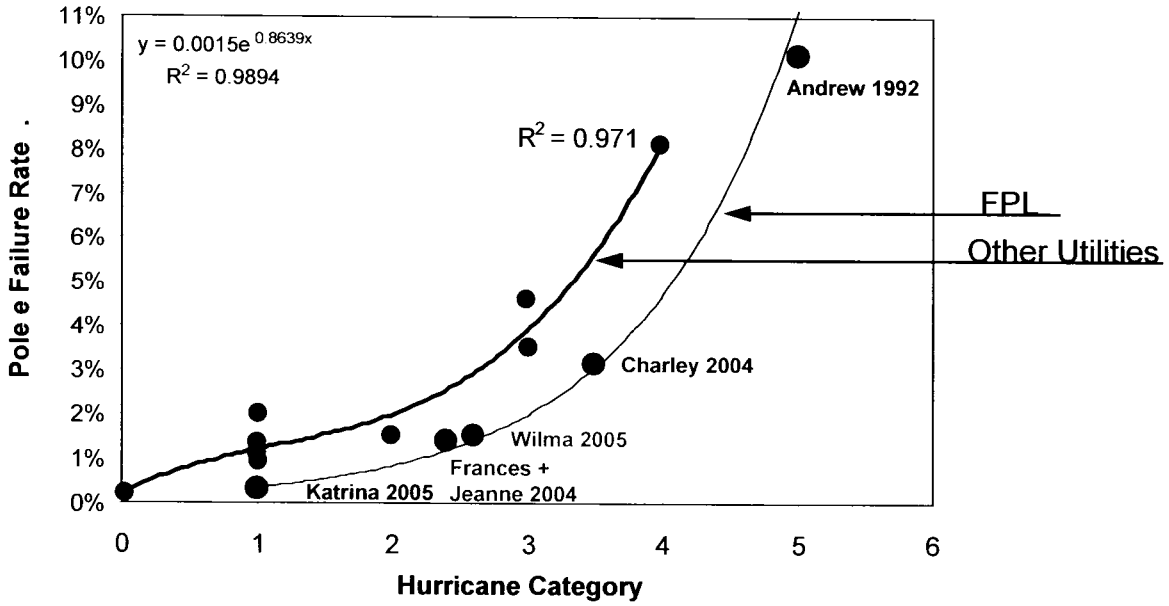
2008 and 2009 CIF Projects

Fdr	County	Facility Type	Facility Name
406234	Palm Beach	Acute Care	Jupiter Hospital
401837	Palm Beach	Acute Care	Jupiter Hospital
408961	Palm Beach	Acute Care	Jupiter Hospital
402636	Palm Beach	Acute Care	Palm Beach Gardens Medical Center
407663	Palm Beach	Acute Care	Palms West Hospital
405266	Palm Beach	Acute Care	Wellington Regional Medical Center
409634	Palm Beach	Acute Care	West Boca Medical Center
505165	Sarasota	Acute Care	Doctor's Hospital of Sarasota
500765	Sarasota	Acute Care	Englewood Community Hospital
500333	Sarasota	Acute Care	Venice Regional Medical Center
200131	Seminole	Acute Care	Central Florida Regional Hospital
106232	St Johns	Acute Care	Flagler Hospital
106234	St Johns	Acute Care	Flagler Hospital
300634	Suwannee	Acute Care	Shands at Live Oak
102431	Volusia	Acute Care	Florida Hospital Oceanside
101136	Volusia	Acute Care	Florida Hospital Ormond Memorial
100838	Volusia	Acute Care	Halifax Hospital Port Orange
300961	Baker	Smaller Hospital	NORTHEAST FLA STATE HOSP
203631	Brevard	Smaller Hospital	SEA PINES REHABILITATION HOSPITAL
700233	Broward	Smaller Hospital	KINDRED HOSPITAL - HOLLYWOOD
704135	Broward	Smaller Hospital	KINDRED HOSPITAL - HOLLYWOOD
700135	Broward	Smaller Hospital	KINDRED HOSPITAL - LAS OLAS
700144	Broward	Smaller Hospital	KINDRED HOSPITAL - LAS OLAS
702833	Broward	Smaller Hospital	Memorial Hospital Pembroke Urgent Care Center/Memorial Manor/South Florida State Hospital
702835	Broward	Smaller Hospital	SOUTH FL STATE HOSPITAL
701835	Broward	Smaller Hospital	ST ANTHONY'S REHAB HOSPITAL
704663	Broward	Smaller Hospital	SUNRISE REHABILITATION HOSPITAL
501237	Collier	Smaller Hospital	NAPLES COMMUNITY HOSPITAL
802832	Dade	Smaller Hospital	ST CATHERINE REHABILITATION HOSPITAL
810161	Dade	Smaller Hospital	BAPTIST MEDICAL PLAZA AT DORAL
807037	Dade	Smaller Hospital	CITRUS HEALTH NETWORK/SOUTHERN WINDS HOSPITAL
803545	Dade	Smaller Hospital	JACKSON MEMORIAL MENTAL HEALTH HOSPITAL
805832	Dade	Smaller Hospital	JACKSON SOUTH
804236	Dade	Smaller Hospital	MIAMI CHILDRENS SOUTH DADE
808337	Dade	Smaller Hospital	MIAMI REHABILITATION HOSPITAL
801734	Dade	Smaller Hospital	SOUTH DADE REHABILITATION HOSPITAL
802434	Dade	Smaller Hospital	SOUTH MIAMI HOSPITAL
807032	Dade	Smaller Hospital	SOUTHERN WINDS HOSPITAL
805735	Dade	Smaller Hospital	WESTCHESTER CLINIC
507065	Lee	Smaller Hospital	BONITA COMMUNITY HEALTH CENTER
505462	Lee	Smaller Hospital	SOUTHWEST FLA REG MED CNTR
406532	Palm Beach	Smaller Hospital	JFK HOSPITAL
101135	Volusia	Smaller Hospital	FLORIDA HOSPITAL - ORMOND MEMORIAL
101534	Volusia	Smaller Hospital	HALIFAX HOSPITAL
200336	Brevard	911	BREVARD COUNTY BOARD OF COUNTY COMMISSIONERS
200432	Brevard	911	CITY OF COCOA
201833	Brevard	911	CITY OF COCOA BEACH
202031	Brevard	911	CITY OF INDIAN HARBOUR BEACH
200535	Brevard	911	CITY OF MELBOURNE
204262	Brevard	911	CITY OF PALM BAY
204132	Brevard	911	CITY OF SATELLITE BEACH
203934	Brevard	911	CITY OF TITUSVILLE
203234	Brevard	911	TOWN INDIALANTIC
700737	Broward	911	BCBC#EMS 3679682 C PUBLIC SAFETY BUILDING
707267	Broward	911	CITY OF MIRAMAR
702636	Broward	911	CITY OF POMPANO
702433	Broward	911	MIAMI-DADE CO OCSIS TELE-COMMUNICATION 14
501535	Charlotte	911	CHARLOTTE CO COMM

2008 and 2009 CIF Projects

Fdr	County	Facility Type	Facility Name
503563	Collier	911	COLLIER CNTY SHERIFF DEPT
306133	Columbia	911	COLUMBIA COUNTY BOARD OF COUNTY COMMISSIONERS
805138	Dade	911	CITY OF MIAMI FIRE-RESCUE STATION #3 - MIAMI 911 ANTENNA & TRANS
805535	Dade	911	HIALEAH CITY OF POLICE DEPT
802533	Dade	911	MIAMI-DADE CO ETSD-PUBLIC SAFETY RADIO SITE 1
805733	Dade	911	MIAMI-DADE CO ETSD-PUBLIC SAFETY RADIO SITE 11/MIAMI-DADE CO GSA ETSD 11
805932	Dade	911	MIAMI-DADE CO ETSD-PUBLIC SAFETY RADIO SITE 14
809666	Dade	911	MIAMI-DADE CO ETSD-PUBLIC SAFETY RADIO SITE 14
810064	Dade	911	MIAMI-DADE CO ETSD-PUBLIC SAFETY RADIO SITE 14
810366	Dade	911	MIAMI-DADE CO ETSD-PUBLIC SAFETY RADIO SITE 14
800440	Dade	911	CORAL GABLES
806534	Dade	911	VILLAGE OF PINECREST - 911 DISPATCH
101461	Flagler	911	FLAGLER COUNTY SHERIFF'S OFFICE
506162	Lee	911	LEE CO COMMISSION
500236	Manatee	911	CITY OF BRADENTON/COUNTY OF MANATEE BCC PROP APPRAISER
401137	Martin	911	MARTIN COUNTY BOARD OF COMMISSIONERS
404938	Martin	911	MARTIN COUNTY BOARD OF COMMISSIONERS
301464	Nassau	911	NASSAU COUNTY SHERIFF DEPARTMENT - NASSAU 911 & SHERIFF
401632	Okeechobee	911	OKEECHOBEE CO BD OF COMM
403034	Palm Beach	911	BD OF PB CO COMM
403031	Palm Beach	911	BD OF PB CO COMM SHERIFF'S DEPT
408031	Palm Beach	911	CITY OF BOCA RATON - BOCA 911,EOC,PHONE TOWERS
401933	Palm Beach	911	CITY OF DELRAY BCH - DELRAY PD/911
405631	Palm Beach	911	CITY OF GREENACRES - 911,EOC,EMS,PD,FD
406236	Palm Beach	911	TOWN OF JUP INLET BCH
402835	Palm Beach	911	TOWN OF MANALAPAN - 911 MANALAPAN/ S PALM BCH
400533	Palm Beach	911	TOWN OF OCEAN RIDGE - 911/PD/EOC/TOWNHALL
405264	Palm Beach	911	VILLAGE OF ROYAL PALM BEACH - 911 DISP, PD, MUN COMPLEX
101635	Putnam	911	PUTNAM COUNTY SHERIFFS DEPT
504135	Sarasota	911	ALLTEL FLORIDA INC - TOWER WEST OF SCTI SCHOOL
500933	Sarasota	911	COUNTY OF SARASOTA FACILITIES
500763	Sarasota	911	COUNTY OF SARASOTA FACILITIES
500131	Sarasota	911	COUNTY OF SARASOTA FACILITIES
503264	Sarasota	911	COUNTY OF SARASOTA FACILITIES
500133	Sarasota	911	COUNTY OF SARASOTA FACILITIES 0201
505765	Sarasota	911	SPRINTCOM INC
207934	Seminole	911	SEMINOLE COUNTY BOARD OF COUNTY COMMISSIONERS
204636	Seminole	911	SEMINOLE COUNTY BOARD OF COUNTY COMMISSIONERS
207262	Seminole	911	SEMINOLE COUNTY BOARD OF COUNTY COMMISSIONERS
205362	Seminole	911	SEMINOLE COUNTY BOARD OF COUNTY COMMISSIONERS
408461	St Lucie	911	ST LUCIE COUNTY BD OF COUNTY COMM
108262	Volusia	911	COUNTY OF VOLUSIA

Storm Pole Replacements



Davies Consulting, Inc. Benchmark Analysis

- **Analysis includes 6 hurricanes and 10 utilities (FPL builds to Grade B – all others build to Grade C)**
- **Shows pole failure rates and storm strength/category**
- **Indicates FPL experienced lower pole failure rates vs. others**
- **Indicates better pole performance - Grade B vs. Grade C**

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI EXHIBIT 22
COMPANY FPL (Direct)
WITNESS Manuel B. Miranda (MBM-3)
DATE 10/02 & 03/07

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO._____ EXHIBIT #23 Not Entered
COMPANY _____
WITNESS _____
DATE _____

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. _____ EXHIBIT #24 Not Entered
COMPANY _____
WITNESS _____
DATE _____

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. _____ EXHIBIT #25 Not Entered
COMPANY _____
WITNESS _____
DATE _____

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO._____ EXHIBIT #26 Not Entered
COMPANY _____
WITNESS _____
DATE _____

PROCESS TO ENGAGE THIRD PARTY ATTACHERS

1. The electric utility and third-party attachers will engage in a continuous dialogue on the status of the electric utility's storm hardening plans. A third-party attacher that wishes to be part of this process ("Participant") shall provide notification in writing to the electric utility, providing the name and address of the person designated to receive communications from the electric utility. The electric utility may, no more than once a year, request that Participants confirm that they wish to continue being part of the process and update the name and address of the person designated to receive communication.

2. By September 5 of each year, the electric utility shall provide the Participants with a list of the projects identified in the electric utility's approved storm hardening plan on file with the Commission ("Plan") that the electric utility proposes to undertake in the following calendar year, pending internal budget approval. The electric utility shall provide the Participants with a list of such projects receiving final budget approval promptly as it becomes available.

3. Prior to engineering a job relative to a storm hardening project identified in its Plan, the electric utility shall initiate a meeting with Participants to discuss the electric utility's preliminary ideas for the scope of work ("Pre-Design Meeting"). At the Pre-Design Meeting, the electric utility shall (a) identify the poles involved; (b) identify whether the electric utility plans to

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070297 298 299 EXHIBIT 27
COMPANY AT&T / TCG (Direct)
WITNESS Kirk Smith (KS-1)
DATE 10/2+3/05

replace poles, change from wood poles to poles of another material (*e.g.*, steel or concrete), place poles in locations different from the existing poles, relocate overhead facilities or underground existing aerial facilities, and; (c) provide the projected commencement date, and; (d) upon request by a Participant, provide other available information that would enable the Participants to make necessary preparations and evaluate whether to seek dispute resolution pursuant to Rule 25-6.0342(7). During this pre-design phase of a project, the electric utility shall also seek input from Participants as required by Rule 25-6.0342(6).

4. The electric utility shall provide Participants with final engineering plans promptly upon completion. Prior to beginning construction, the electric utility shall initiate a meeting with Participants to discuss coordination of work and a construction schedule.

5. Information submitted to Participants pursuant to section 2, 3 or 4 above regarding projects identified in the electric utility's Plan will not be docketed unless a protest is filed in accordance with Rule 25-6.0342(7), or it is otherwise deemed necessary by the Commission.

6. If the electric utility seeks to amend its Plan by, for example, adding a project not previously identified in its Plan, it shall file a petition with the Commission requesting that the Plan be modified in accordance with Rule 25-6.0342(2).

7. The electric utility will file with the Commission by March 1 each year a status report of its implementation of its Plan. Included in this status

report shall be the name of storm hardening projects commenced and/or completed by the electric utility, the routes and circuits affected, and any comments on the project received from third-party attachers.

BELLSOUTH TELECOMMUNICATIONS, INC.
d/b/a AT&T FLORIDA

DIRECT TESTIMONY OF KIRK SMITH

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NOS.
070298-EI
070299-EI
070301-EI

SEPTEMBER 7, 2007

Q. PLEASE STATE YOUR NAME, YOUR POSITION WITH BELLSOUTH TELECOMMUNICATIONS, INC. d/b/a AT&T FLORIDA ("AT&T FLORIDA" OR THE "COMPANY"), AND YOUR BUSINESS ADDRESS.

A. My name is Kirk Smith. I am employed by the Company as Supervising Manager – Network Staff Support on the Network Operations Construction and Engineering Staff for the Company's nine-state Southeast region. My business address is 3535 Colonnade Parkway, Rm. W3D, Birmingham, Alabama 35243.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR BACKGROUND AND EXPERIENCE.

A. I graduated from Auburn University in 1973 with a Bachelor of Science degree in Industrial Engineering. I became employed by the Company in June 1973. I have held various line and staff positions with the Company, including positions in Construction, Engineering, Installation, Maintenance, Mechanization (Deployments

and Support) and Contract Administration (Outside Plant Construction, Facility Locates, Engineering and Joint Use). I managed Regional Emergency Generator Pools that deploy emergency generators in large scale power outages throughout the Company's nine-state southeast region. I provided support in my capacity as Manager–Network Operations Support for the Company to its Regional Emergency Control Center and have field experience in storm restoration, including hurricanes, ice storms and tornadoes. I assumed my current position as Supervising Manager – Network Staff Support on the Network Operations Construction and Engineering Staff in October 2002, and my current responsibilities include supervising a team of managers responsible for bidding and negotiating contracts for Outside Plant Construction, Facility Locating, Engineering, and Joint Use. The team is also responsible for administration of CATV license agreements, agreements for CLECs pertaining to pole attachments and conduit occupancy, and agreements for attachments to towers on some central offices. I participated at the various workshops held in this matter. I also participated in Docket No. 060077-TL regarding the mandated pole inspection cycle, and Dockets Nos. 060172-EU and 060173-EU regarding storm hardening activities of investor-owned, rural cooperative and municipal electric utilities.

Q. HAVE YOU ATTACHED ANY EXHIBITS TO YOUR TESTIMONY?

A. Yes, I have attached Exhibit KS-1 to my testimony.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to explain AT&T Florida's position on the 2007 – 2009 storm hardening plans (the "Plans") filed by Gulf Power Company, Progress Energy Florida, Inc., and Florida Power & Light Company (collectively referred to as the "IOUS") with the Florida Public Service Commission (the "Commission") on May 7, 2007.

Q. PLEASE PROVIDE AN OVERVIEW OF AT&T FLORIDA'S POSITION REGARDING THE IOUS' PLANS.

A. As a result of cooperative, good faith negotiations, AT&T Florida and the IOUs have reached an agreement wherein AT&T Florida and the IOUs have committed that they will support the jointly developed terms and conditions contained in the Process to Engage Third-Party Attachers (the "Third-Party Attacher Process"), a copy of which is attached as Exhibit KS-1. It is my understanding that Tampa Electric Company, Verizon, Embarq and Florida Cable Telecommunications Association have also agreed to the Third-Party Attacher Process. AT&T Florida submits this testimony, in part, to explain the Third-Party Attacher Process and its value.

In addition, based on our review of the project details that the IOUs have included in their respective Plans and with the agreement between AT&T Florida and the IOUs

to support the Third-Party Attacher Process, AT&T Florida has no objections to the IOUs' respective Plans at this time.

Q. PLEASE EXPLAIN THE PURPOSE OF THE THIRD-PARTY ATTACHER PROCESS.

A. AT&T Florida appreciates the Commission's interest in minimizing widespread power outages in the state following hurricanes or other extreme adverse weather conditions. As Rule 25-6.0342 of the Florida Administrative Code (the "Rule") provides, however, the IOUs have a responsibility to develop storm hardening plans that meet the desired objectives of enhancing reliability and reducing restoration costs and outage times in a manner that is prudent, practical and cost-effective to the affected parties. AT&T Florida's primary concerns are that it (1) have sufficient time to review the IOUs' detailed deployment plans, (2) have the opportunity to provide meaningful input to the IOUs as contemplated by the Rule, (3) have enough details about the proposed work so that AT&T Florida can ascertain its projected costs and perform the cost-benefit analysis contemplated by the Rule, and (4) have sufficient time to communicate concerns, if any, to the Commission through the complaint process referenced in the Rule. The Third-Party Attacher Process alleviates these concerns by establishing a reasonable timetable for the exchange of information between the IOUs and the third-party attachers. The Third-Party Attacher Process is a critical tool for ensuring that an electric utility is hardening its

infrastructure in a way that is prudent, practical and cost-effective to affected parties as required by the Rule.

Q. PLEASE EXPLAIN FURTHER WHY AT&T FLORIDA VIEWS THE THIRD PARTY ATTACHER PROCESS AS CRITICAL TO COST-EFFECTIVE STORM HARDENING.

In order to perform a meaningful cost-benefit analysis of a particular storm hardening project, AT&T Florida needs to know which poles will be affected, as well as the type of work the electric utility plans to perform. For example, AT&T Florida needs to know whether the electric utility will replace poles, change from wood poles to poles of another material such as concrete or steel, place poles in locations different from the existing poles, or relocate or underground existing aerial facilities. Once AT&T Florida has this level of detail, it can evaluate how its facilities will be impacted, what work it would need to perform, and if there are potentially more cost-effective ways to harden the infrastructure in question.

I understand that it may not be feasible for electric utilities to develop this level of detail years, or sometimes even many months in advance of a storm hardening project due to changes in field conditions, changes in service needs, and even changes in internal budgets. Without this level of detail, however, AT&T Florida cannot perform a meaningful cost benefit analysis of a proposed project as required by the Rule. Even for proposed projects that the IOUs have provided a higher level

of detail for, engineering plans can change as you get closer in time to the start of the project for the reasons I previously mentioned.

The Third-Party Attacher Process is a way to address this engineering reality. It ensures that the electric utility engages third-party attachers during the design phase of a project and that the dialogue continues through the construction phase. Under the Third-Party Attacher Process, AT&T Florida will have sufficient time to review the electric utility's proposed engineering plans, determine how AT&T Florida's facilities will be affected and provide input on potentially more cost-effective ways to achieve the storm hardening goals. In the end, if the parties cannot overcome a disagreement, AT&T Florida will also have sufficient time to file a complaint with the Commission pursuant to the Rule.

As an added benefit, the Third-Party Attacher Process opens the lines of communication between the parties which will likely result in a better overall working relationship, even beyond the storm hardening context.

Q. HOW WILL THE THIRD-PARTY ATTACHER PROCESS WORK?

A. By September 5 of each year, each IOU will provide the third-party attachers with a list of projects identified in its 3-year plan that the IOU plans to undertake in the following calendar year, pending internal budget approval. The IOU will update

this list and provide it to the third-party attachers once it receives final budget approval for the proposed projects.

Prior to engineering a job relative to a storm hardening project identified in its Plan, the IOU will initiate a meeting with third-party attachers to discuss the IOU's preliminary ideas for the scope of the work. At this pre-design meeting, the IOU will (a) identify the poles involved; (b) identify whether it plans to replace poles, change from wood poles to poles of another material, place poles in different locations than the existing poles, relocate overhead facilities or underground existing aerial facilities; (c) provide the projected commencement date; and (d) provide other available information that would enable the third-party attachers to make necessary preparations and evaluate whether to seek dispute resolution before the Commission. During this pre-design phase, the IOU will also seek input from the third-party attachers as required by the Rule. Once the IOU finalizes its engineering plans, it will promptly provide them to the third-party attachers. The IOU will also initiate a meeting with third-party attachers prior to construction to discuss coordination of work and a construction schedule.

If the IOU wants to amend its Plan, for example, to add a storm hardening project not previously identified in its Plan, it can file a petition with the Commission pursuant to the Rule.

Again, it is my opinion that implementation of the Third-Party Attacher Process gives the electric utilities the flexibility to finalize some of their engineering plans closer in time to construction, while giving the attaching entities sufficient time to evaluate specific projects, provide input on them, perform a meaningful cost benefit analysis, and bring concerns before the Commission if necessary.

Q. Does this conclude your direct testimony?

A. Yes.

PROCESS TO ENGAGE THIRD PARTY ATTACHERS

1. The electric utility and third-party attachers will engage in a continuous dialogue on the status of the electric utility's storm hardening plans. A third-party attacher that wishes to be part of this process ("Participant") shall provide notification in writing to the electric utility, providing the name and address of the person designated to receive communications from the electric utility. The electric utility may, no more than once a year, request that Participants confirm that they wish to continue being part of the process and update the name and address of the person designated to receive communication.

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4. The electric utility shall provide Participants with final engineering plans promptly upon completion. Prior to beginning construction, the electric utility shall initiate a meeting with Participants to discuss coordination of work and a construction schedule.

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6. If the electric utility seeks to amend its Plan by, for example, adding a project not previously identified in its Plan, it shall file a petition with the Commission requesting that the Plan be modified in accordance with Rule 25-6.0342(2).

7. The electric utility will file with the Commission by March 1 each year a status report of its implementation of its Plan. Included in this status

report shall be the name of storm hardening projects commenced and/or completed by the electric utility, the routes and circuits affected, and any comments on the project received from third-party attachers.

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070298-EI 070301-EI EXHIBIT 28
COMPANY FCTA (Direct)
WITNESS Michael T. Harrelson (MTH-1)
DATE 10/02r03/07

CURRICULUM VITAE
M. T. (MICKEY) HARRELSON

M. T. (Mickey) Harrelson
P. O. Box 432
McRae, GA 31055

Phone: (912) 568-1504
Cell: (229) 860-1300
Fax: (912) 568-1502

Registered Professional Engineer (Electrical) GA#10724 (1976)
Registered Professional Engineer (Electrical) FL #51788 (1997)

EDUCATION: B.S. Industrial Engineering (Co-op) GA TECH, 1970

WORK EXPERIENCE:

1959-	Worked part-time with Harrelson Electric Co., owned by my father.
1963	W. T. Harrelson, doing residential, commercial, & industrial electrical and repair work in McRae, GA.
Dec. 1963- Mar. 1970	Co-op student of Georgia Power Co. in Electric Distribution Operating, McRae, GA, & Commercial Sales, North Atlanta.
Apr. 1970- Jan. 1972	Lieutenant in U. S. Army Air Defense, Minneapolis, MINN, & Yong Son, KOREA. Served as Battery Commander, Korea. Military Status: Inactive, Army Reserves; Rank: Captain.
Feb. 1972- June 1974	Operating Engineer, Brunswick, Georgia Power Co.; Designing, operating, and maintaining distribution system and operating transmission system.
June 1974- Feb. 1976	Senior Commercial Marketing Engineer, Brunswick. Selling wise use of electricity to new and existing commercial customers in Brunswick area. This included lighting design to I.E.S. standards, and consultations regarding the National Electrical Code.
Feb. 1976- June 1978	Operating Engineer, St. Simons Island, Ga. Power; Designing, operating, & maintaining distribution system & operating transmission system.
June 1978- May 1986	District Engineer; Supervised engineering and operation of Brunswick District of Ga. Power Co., including Kingsland Operating Headquarters.

May 1986-Sept. 1989	Area Manager, McRae, Ga. Power Co; Restructure McRae, Eastman, Hazlehurst into area operation, and supervise and coordinate all company activities in the area.
Sept. 1989-April 1992	District Power Delivery Manager, Milledgeville District; Manager of Engineering, Construction, & Maintenance of the electric distribution system and operation of the transmission & distribution system.

Note: During 28 years with Georgia Power Company, I was involved with claims, damage and accident investigations. From 1978 through 1992, I was in charge of these activities at my location.

April 1,1992	Resigned from Georgia Power Company, Reason for leaving: Early retirement incentive package gave excellent opportunity to pursue independent consulting engineer goals.
April 1,1992 to present	Electric Utility Consulting Engineer. Investigated accidents and testified in matters involving the National Electrical Safety Code, OSHA regulations, utility company safety manuals, employee training courses, accepted good work practices, and the National Electrical Code. These cases have involved electrical contact, flash, and burn injuries, collisions with poles and guy wires, falls from poles, etc., hydraulic oil fires, crushing injuries, property losses from fires, stray voltage, etc. The companies involved have been electric, telephone, cable TV, and product manufacturing companies. I do management consulting and safety and engineering training for electric cooperatives, engineering consulting companies and private industry I do electric power line inspections for electric cooperatives as required by the Rural Utility Service. I inspect power lines and communications lines built jointly for National Electrical Safety Code compliance. I teach N.E.S.C. compliance and train field engineers and technicians in joint use compliance. I assist CATV, Power, and Telephone companies in interpreting the NESC and applying its rules to joint use of utility poles.

OTHER COURSES AND SEMINARS:

1974	13 weeks Commercial Sales Training by Ga. Power Co., including interior & exterior lighting design, & National Electrical Code.
1975	1 week General Electric Outdoor Lighting School, Hendersonville, NC.
1976	8 weeks Electric Operations Training by Ga. Power Co.

1977	1 week Principles of Leadership Training, Ga. Power Co.
1979	1 week Basic Management Training by Ga. Power Co.
1980-1985	Served as "Leader" of Engineering Dept Quality Circle.
1981	1 week Communications-General Training by Ga. Power Co.
1982	1 week Human Relations Skills Training by Ga. Power Co.
1987	3 days Interpersonal Skills Seminar by Ga. Power Co.
1988	1 week Management Grid School, Mobile, AL, Training by Southern Co.
1988	13 weeks Community Leadership Class sponsored by University of GA Cooperative Extension Service and Telfair County.
1989	1 week Negotiating Edge Seminar, Athens, GA., Training by Ga. Power Co. and Susan Wise
1989	Basic Economic Development Course, GA Institute of Technology
1990	3 months- Committee assignment (met bi-weekly) to formulate Ga. Power Company Guarantee Policy
1991	6 months-Committee assignment (met bi-weekly) to develop "District Operations Performance Measurement" facilitated by Ernst & Young Co.
1991	3 months-Committee assignment (met bi-weekly) to assess Georgia Power Company Marketing Dept Readiness for Incentive pay.
1992	1 week advanced Negotiating Skills Seminar, Peachtree City, Training by Ga. Power Co. & The Executive Speaker, Inc.
1992	1 day IEEE Seminar on 1993 National Electrical Safety Code
1993	2 day NRECA Safety Accreditation Team Training & Testing Seminar
1994	3 day Seminar-The Development & Application of the National Electrical Safety Code by Allen Clapp
1995	2 day ILCI (International Loss Control Institute, Inc.) Seminar on accident investigation
1996	1 day IEEE Seminar - "Changes in me 1997 NESC."
1997	3 day Seminar - "Application of 1997 NESC."

MEMBERSHIPS AND AFFILIATIONS:

1970-present	Member, Georgia Tech Alumni Association
1974-present	Member, Georgia & National Society of Professional Engineers
1978-1986	Member, Glynn County GA Electrical Inspection Board
1992-present	Member, Telfair Co. Chamber of Commerce
1992-present	Member, Institute of Electrical & Electronics Engineers (IEEE)
1993-2002	Board Member, Telfair County Industrial Development Authority

1993-2002	Member, Illuminating Engineering Society of North America (IECNA)
1993-present	Rural Electric Safety Accreditation Program (RESAP) certified accreditation inspector
1994-present	Member, National Fire Protection Association

TESTIMONY BY MICHAEL T. HARRELSON, P. E.

1. 5-2006 to 8-2007	**Florida Public Service Commission for FCTA** Michael Gross Attorney Maria Browne, Attorney Beth Keating, Attorney	Written comments and verbal comments
2. 4-27-06 & 5-1-06	**FCTA, et. al vs. Gulf Power Company Before the FCC** John Seiver Cole, Raywid & Braverman, L.L.P. 1919 Pennsylvania AVE, NW – Suite 200 Washington, D.C. 20006	Testimony
3. 3-31-06	**FCTA, et. al vs. Gulf Power Company Before the FCC** John Seiver Cole, Raywid & Braverman, L.L.P. 1919 Pennsylvania AVE, NW – Suite 200 Washington, D.C. 20006	Written Testimony
4. 3-16-06 & 3-21-06	**FCTA, et. al vs. Gulf Power Company Before the FCC** John Seiver Cole, Raywid & Braverman, L.L.P. 1919 Pennsylvania AVE, NW – Suite 200 Washington, D.C. 20006	Deposition Testimony
5. 3-13-06	**Comcast of Arkansas v. Entergy Arkansas Before the FCC** John D. Thomas Hogan & Hartson LLP 555 Thirteenth ST, NW	Deposition Testimony

Washington, D.C. 20004

6. 4-16-05 **Louisiana Public Service Commission** Written Testimony

For LCTA

John D. Thomas
Cole, Raywid & Braverman, L.L.P.
1919 Pennsylvania Ave., NW - Suite 200
Washington, D.C. 34358

7. 2-15-05 **CTA Arkansas vs. Entergy** FCC Written Testimony

John D. Thomas -- *for Plaintiff*
Cole, Raywid & Braverman, L.L.P.
1919 Pennsylvania Ave., NW - Suite 200
Washington, D.C. 34358

8. 1-10-05 **Clinton vs. Florida Keys Electrical Cooperative, Inc.** Deposition & Trial

Sixteenth Judicial Circuit Court in and for Monroe Co., Florida

Eric Peterson -- *For Defendant*
Peterson Benard
P. O. Drawer 15700
700West Palm Beach, FL 33416

H. Clay Roberts -- Plaintiff
Proenza, Roberts, Hurst, P.A.
2900 W 28th Terrace, Suite
Miami, Florida 33133

9. 12-03-04 **MEAG vs. Goodman** Testified at Hearing

Mr. Robert Wilmot -- *For Plaintiff*
P. O. Draw 1287
Tifton, GA 31793

MEAG Power Company right-of-way encroachment suit to clear transmission line

right-of-way of mobile homes.

10. 10-22-04 **Caldwell vs. Howard Industries, No. 4:03-cv-198-3** Deposition

United States District Court, Middle District of Georgia, Columbus Division

Lester Tate -- *For Plaintiff*
Akin & Tate
P. O. Box 878
Cartersville, GA 30120

William T. Mitchell, Defense
Cruser & Mitchell, LLP
3500 Parkway Lane
Norcross, GA 30092

11. 6-23-04 Comcast Cable vs. Pacificorp
Deposition

Angela W. Adams -- *For Claimant*
Ballard Spahr Andrews & Ingersoll, LLP
One Utah Center, Suite 600
201 Main Street
Salt Lake City, Utah 84111-2221

12. 6-8-04 Saffold vs. Aldrich Rent-All
Deposition

Heather B. Bush -- *For Defendant*
Peterson Bernard
1550 Southern Boulevard, Suite 300
West Palm Beach, Florida 33416

13. 9-04-03 Perkins v. Georgia Power Company and Altec
Deposition

Attorneys Langston Bass and Hugh McNatt
Defendant
State Court Candler Co., GA

Contractor Lineman contacted 27,000 volts hand-to-band. He was not wearing rubber gloves. He lost both arms. He sued Altec for inadequate bucket truck design and GA Power for inadequate planning and supervising of work. *Settled out of Court.*

14. 5-02-03 McKeown v. CHELCO, et al Deposition & Trial

Attorney Alan E. Horkey -- *For Defendant*
700 S Palofex Street, Suite 170
Pensacola, Florida 32501
Circuit Court, Walton Co., FL

A teen-aged boy hit power pole with pick-up truck in rain on a curve. He had a severe head injury. He sued electric co-op, claimed they should have moved the pole since it had been hit twice before. Pole location complied with code and DOT guidelines. *Jury verdict gave court cost only to plaintiff.*

15. 11-09-01 Duffie vs. Clay Electric Co-op & Cox Cable et al Deposition & Arbitration

Attorney Craig Cooley -- *For Defendant*
200 East Robinson Street, Suite 555
Orlando, Florida 32801
Circuit Court Alachua Co., FL

A motorcycle rider hit a power line which fell across a U. S. Highway. A contributing factor was that a Cox Cable anchor had been improperly installed. This allowed a Clay

Electric Co-op pole to break in four pieces. *Settled at arbitration by Clay, Cox and two Cox sub-contractors.*

16. 12-13-00 Darley vs. Amusements of America, Inc.
Deposition

Attorney Robert R. Gunn -- *For Defendant*
P. O. Box 1606
Macon, GA 31202
State Court, Bibb County, GA

A young man got electric shock when he took hold of a metal rail on the platform of an amusement ride. *Settled*

17. 11-21-00 Causey vs. Okefenoke REMC
Deposition

Attorney Mark Barber -- *For Defendant*
136 N Fairground Street, Suite 100
Marietta, GA 30060
Superior Court, Brantley Co., GA

An onlooker was killed by burning transformer oil. He was watching a lineman attempt to stop an oil leak when the explosion and fire occurred. *Settled*

18. 10-18-00 Malin vs. McElmurray & Oellerich Electrical Service Deposition & Trial

Attorney David Bell -- *For Plaintiff*
P.O. Box 1011
Augusta, GA 30903
Superior Court, Richmond Co., GA

A young man was killed while cleaning pipes in a milking barn when he touched a light fixture which was not grounded. *Jury verdict for $1,000.000.00*

19. 10-04-00 Moses vs. Bill's Dollar Store, et al Deposition & Trial

Attorney David Bell -- *For Plaintiff*
P.O. Box 1011
Augusta, GA 30903
State Court, Gwinnett Co., GA

A gas company employee was killed when he touched a metal rack which held an air conditioning unit. The unit was not grounded. *Settled*

20. 1-25-00 Byrd vs. Glades Electric Co-op
Deposition

Attorney Robert Swartz -- *For Defendant*

Ft. Lauderdale, Florida
Circuit Court, Glades Co., FL

A flatbed truck crane operator was killed when he put the steel cable into a 7200-volt line. He jumped clear of the truck, then attempted to get in the cab and was electrocuted. *Settled.*

21. 9-10-99 Scruggs vs. Georgia Power Company
Deposition

Attorney Rowland Dye -- *For Defendant*
P. O. Box 2426
Augusta, GA 30903
State Court, Georgia

A truck hit a low power line service which had been previously hit by an over-height load of hay. *Settled.*

22. 3-12-97 Price vs. City of Thomasville Deposition & Trial

Attorney Hugh McNatt -- *For Defendant*
Vidalia, GA
Federal Court, Albany, GA

A contractor lineman was badly burned and electric shocked when he lost control of a large wire and violated several other safe-work practices. *Settled.*

23. 12-06-96 Dennard vs. Altec
Deposition

Attorney Lester Tate -- *For Plaintiff*
P. O. Box 878
Cartersville, GA 30120

A lineman's hand was crushed when it was caught between the control lever of his bucket truck and the bottom of a transformer. The control levers were poorly designed. *Settled.*

24. 7-17-96 Raulerson vs. Okefenoke REMC
Deposition

Attorney Richard Rumrell -- *For Defendant*
One Hundred BLDG, Suite 250
Jacksonville, FL 32256
Circuit Court, Duval Co., FL

A laborer was killed when the electric meter pole he was setting contacted a 14,400-:volt power line. Telephone drop wires and cable television were a factor in making the power line lower. *Settled.*

25. 7-02-96 McCoy vs. Coach & Campers of Atlanta
Deposition

Attorney Nikolai Makarenko, Jr, -- *For Defendant*
100 Galleria Parkway, Suite 1510

Atlanta, GA 30309
State Court, Dekalb Co, GA

A customer separated his shoulder when the RV home shocked him. He was on the ladder on back, touched a grounded chain link fence and fell. The electric circuit to the RV was not grounded. *Settled.*

26. 6-07-96 Habeishi vs.Greystone Power Corp. Deposition & Trial

Attorneys Tisinger, Tisinger, Vance & Greer -- *For Defendant*
P.O. Box 2069
Carrollton, GA 30117
Federal Court, Northern District, GA

The electric power was off to a traffic signal because an electrical connection failed. It had been made improperly by Fulton County Traffic Dept. Two cars collided in the intersection killing both wives of the two drivers. *Jury Verdict $7,000,000.00!*

27. 5-16-96 Crossin vs. Central Illinois Light Co.
Deposition

Attorney Richard Glisson - *For Plaintiff*
837 South Fourth Street
Springfield, Illinois 62705
Circuit Court, Sahgamon Co., Illinois

A lineman was electrically shocked when he disconnected a ground wire at the top of a joint transmission and distribution pole. A transformer was connected to the pole ground. The ground was burned open before it connected to the distribution neutral. *Settled.*

28. 3-16-95 Lockhart vs. TCI Cable & BellSouth Deposition & Trial

Attorney M. Francis Stubbs - *For Plaintiff*
P. O. Box 9
Reidsville, GA 30453
Superior Court, Toombs Co., GA

A young man was killed when he struck a TCI guy wire with his neck while riding a motorcycle. The guy wire was abandoned but not maintained in a safe condition. The young man was violating the law by riding off the roadway. *Jury Verdict Defendant's Verdict.*

29. 9-21-94 Vandevender vs. Klein Tools, Inc. Deposition & Arbitration

Attorney Michael Smith - *For Defendant*
240Third ST
Macon, GA 31201
Federal Court, Middle District, GA

A truck operator was badly shocked and burned when he removed his rubber gloves and touched a bucket truck while a hot 7200-volt line was on the ground nearby. He sued Klein Tool Company claiming the grip used broke the wire allowing it to fall. *Arbitration-Defendant's ruling 2 to I.*

30. 8-24-94 Underwood vs. Georgia Power Company
Deposition

Attorney Rowland Dye — *For Defendant*
P.O. Box 2426
Augusta, GA 30903
State Court, Emanuel Co., GA

A laborer attempted to use a 20-foot re-bar to unclog a grain bin auger. He contacted a 7200-volt. power line with the metal bar and lost one arm and had serious burns. He claimed the line was too close. The line complied with the NESC. *Settled.*

31. 4-20-93 Buckner vs. Colquitt Electric Co-op
Deposition

Attorney John Austin — *For Defendant*
400 Perimeter Center Terrace, Suite 1050
Atlanta, GA 30346
Superior Court, Colquitt Co, GA

A laborer was shocked and fell from a pecan tree. He was using a 20-foot long aluminum pole to knock pecans from the limbs. *Settled.*

32. 8-05-90 Lockett vs. Georgia Power Company Deposition & Trial

Attorney Hugh McNatt — *For Defendant*
Vidalia, GA
Superior Court, Telfair Co., GA

Three laborers were raising an aluminum extension ladder under a 7200-volt power line. One was killed, one shocked, one was not hurt. The power line complied with the NESC. *Jury Verdict paid funeral expenses only.*

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070298-EI & 070301-EI EXHIBIT 29
COMPANY FC TA (Direct)
WITNESS Michael T. Harrelson (MTH-2)
DATE 10/02+03/07

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Proposed amendments to rules regarding overhead electric facilities to allow more stringent construction standards than required by National Electric Safety Code	Docket No. 060173-EU
and	
In re: Proposed rules governing placement of new electric distribution facilities underground, and conversion of existing overhead distribution facilities to underground facilities, to address effects of extreme weather events	Docket No. 060172-EU Filed: August 11, 2006

AFFIDAVIT OF DR. LAWRENCE M. SLAVIN

The undersigned, being duly sworn, states as follows:

1. I am currently Principal of Outside Plant Consulting Services, Inc. Previously, I had an extensive career at Lucent (formerly AT&T), Bell Telephone Laboratories and Telcordia Technologies (formerly Bellcore). My career at Bell Laboratories, at which I was selected to be a Distinguished Member of Technical Staff, spanned more than 28 years (1961-1989), primarily in telecommunications product design and development. During the subsequent 12 years (1990-2001), I was a member of Telcordia's research and professional service organizations, and served as Director of the Network Facilities, Components, and Energy Group, responsible for requirements, testing, and analysis of outside plant media, components, and powering for telecommunications applications, as well as related installation and construction guidelines.

2. I received my Ph.D in mechanical engineering from New York University in 1969, my Master of Science in engineering mechanics from New York University in 1963 and my Bachelor of Science in mechanical engineering from The Cooper Union for the Advancement of Science & Art in 1961.

3. I have been an active member of NESC Subcommittee 5 since 1998, including the development of the 2002 edition of the NESC and the recently issued 2007 edition. Subcommittee 5 (Overhead Lines – Strength & Loading) is directly responsible for specifying the storm loads and associated structural strength requirements referenced by the PSC. I am Chair of Working Group 5.7 (Seminars and Presentations; Subcommittee 5), and have served on Working Group 5.2 (Complete Revision of Sections 25 and 26; Subcommittee 5), and on the immediately relevant Working Group 5.8 (Application of Extreme Wind to All Structures; Subcommittee 5). I have also been Chair of Working Group 4.10 (New Ice Loads and Clearances; Subcommittee 4, Overhead Lines – Clearances), and serve on as the Accredited Standards Committee ASC-O5 (responsible for *ANSI O5.1, Wood Poles, Specifications and Dimensions*).

4. As Chair of WG 5.7, I have been responsible for organizing and coordinating the following industry information sessions, as well as providing some of the associated technical presentations:

- ***Panel Session: Structural Reliability-Based Design of Utility Poles and the National Electrical Safety Code*, 2003 IEEE Transmission & Distribution Conference and Exposition, 2003**
- ***Panel Session on National Electrical Safety Code (NESC), 2002 Edition, ANSI C2*, 2001 IEEE Transmission & Distribution Conference and Exposition, 2001**

- ***Panel Session on Proposed Changes to Strength & Loading Requirements for the 2002 Edition of the National Electrical Safety Code (NESC)*, IEEE Power Engineering Society, Towers, Poles & Conductors (TP&C) Subcommittee Meeting, 2000**

I will be chairing a panel session regarding the strength and loading requirements of the 2007 edition of the NESC, and presenting related technical information, at the TP&C Subcommittee Meeting in January 2007.

5. Appendix 1 attached to this Affidavit is a report I have prepared concerning proposed Rule 25-6.034 that is being considered in this proceeding. As I discuss in detail in the report, the proposed rule's requirement that electric utilities be guided by the extreme wind loading standards specified in the 2002 edition of the NESC could result in substantially higher facilities costs and lead to significant unintended consequences. Accordingly, I recommend that this requirement not be included in the proposed rule, or (if this recommendation is not accepted), that certain limitations be adopted.

6. Appendix 2 attached to this Affidavit provides more detailed information concerning my career in the telecommunications and related utility industries, including my activities in relevant professional organizations, such as the Main Committee and several Subcommittees for the NESC.

Further Affiant sayeth naught.

Lawrence M. Slavin

Subscribed and sworn to before me this 10 day of August, 2006.

Notary Public, State of NJ

My commission expires:
May 6, 2009

JENNIFER L OSORIO
NOTARY PUBLIC OF NEW JERSEY
MY COMMISSION EXPIRES MAY 6, 2009

APPENDIX 1

Report Concerning Proposed Rule 25-6.034 As It Relates to Extreme Wind Loading Requirements

1. Introduction

This note provides comments regarding the proposed Florida Public Service Commission (PSC) Rule 25-6.034 to require that the extreme wind loading of the 2002 edition of the National Electrical Safety Code (NESC) be reflected in the design of electric utility-owned poles, including those with third-party (telecommunications) attachments. In particular, NESC-2002 Figure 250-2(d), part of NESC Rule 250C, is cited as a guide. The stated objective of the PSC is to "enhance reliability and reduce restoration costs and outage times" due to hurricane events, such as recently experienced during Hurricane Wilma. The present comments discuss the NESC rules (2002 edition), as applicable to the State of Florida, recent relevant discussions and decisions within the NESC Committee, and the impact of adopting the Extreme Wind Loads of Rule 250C throughout Florida.

2. NESC-2002

The NESC is an American National Standards Institute (ANSI) standard based upon a consensus of those substantially concerned with its scope and provisions, including the Institute of Electrical and Electronic Engineers (IEEE), which also acts as the Secretariat. Other members of the NESC Committee include organizations representing providers of electric power or communications service, their suppliers, and other affected or interested parties. The NESC includes various provisions for the safeguarding of persons from hazards from the installation, operation, and maintenance of electric supply and communication lines and equipment. The rules contain the basic provisions that are considered necessary for the safety of employees and the public.

In general, adherence to the NESC is voluntary; however, many commissions throughout the United States routinely adopt the latest edition, or specific editions, for application within their jurisdictions. For example, the Florida PSC has adopted the 2002 edition.

Sections 25 and 26 of the NESC provide the required strengths and loadings of utility poles and other structures. Section 25 specifies the type storm loads that Grade B or C utility lines are required to withstand. ("Grades of Construction" are discussed below.) Section 26 specifies the required strengths of the structures, as subject to the storm loadings specified in Section 25. (Most of Section 26 -- *e.g.*, Rule 261 -- applies to Grade B or C construction.) Two types of storms are specified -- (1) Combined Ice and Wind Loading (Rule 250B) and (2) Extreme Wind Loading (Rule 250C).

2.1 Combined Ice and Wind (Rule 250B)

Rule 250B refers to the Loading District map, NESC Figure 250-1, reproduced below. The three loading districts in the United States (Heavy, Medium and Light) specify the amount of radial ice buildup and a concurrent wind pressure. The Heavy and Medium districts in the north and central portions of the United States are subject to ½ and ¼ -

inch radial ice buildup, respectively, on all power and communications wires, cables, and conductors, and a concurrent wind pressure corresponding to 40 m.p.h.. The Light district in the southerly portion of the country, including Florida, is assumed to experience no ice buildup, but a wind pressure corresponding to 60 m.p.h. The latter wind speed, although only 50% greater than that assumed in the rest of the country, corresponds to a wind pressure of more than twice that in the Heavy or Medium districts, due to the strong (non-linear) dependence of the wind force on wind speed.[1] However, the lower pressure in the Heavy or Medium district is applied to a greater "sail area" due to the ice buildup on the wires and conductors. Depending upon the wire or conductor diameters, and the ice buildup levels, the resultant transverse loads in the "Light" district may exceed that in the so-called "Heavy" or "Medium" areas. In addition, the application of Rule 250B requires "overload" factors to be applied to the calculated wind forces to provide a conservative margin of safety when selecting appropriate pole sizes. A factor of 2-to-1 is applied to the common Grade C construction, and a factor of 4-to-1 is applied to Grade B construction, where required.[2] (See Section 2.3.) This procedure results in a fairly robust design that experience has shown to provide reliable, safe service.

PART 2. SAFETY RULES FOR OVERHEAD LINES

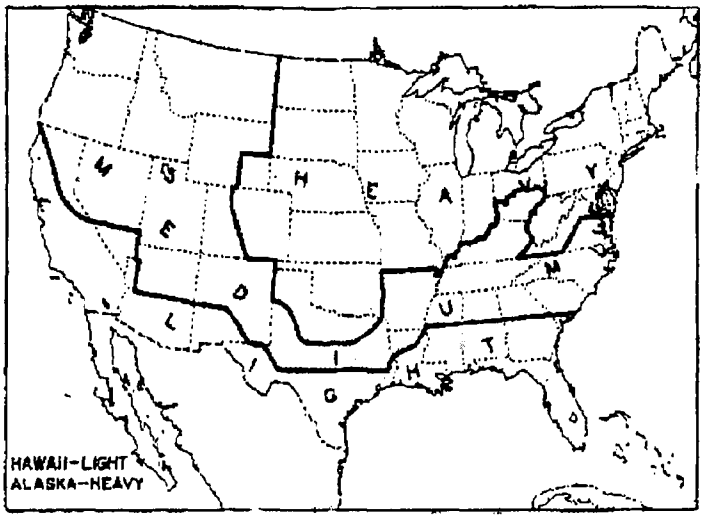

Fig 250-1
General Loading Map of United States
with Respect to Loading of Overhead Lines

[1] The wind pressure, or force, is proportional to the square of the wind speed.
[2] The present discussion assumes "tangent" pole lines, without significant corner angles where guys may be required. For such tangent lines, the transverse wind loads typically represent the critical design condition.

Rule 250B applies to all Grade B or C structures, regardless of height, and is typically used by most utilities to determine the strength requirements for distribution poles.

2.2 Extreme Wind (Rule 250C)

NESC Rule 250C refers to various wind maps, of which Figure 250-2(d), including the state of Florida, is reproduced below. The wind speeds[3] vary from approximately 95 m.p.h. (interpolated) in the north of the state to as much as 150 m.p.h. at the southern tip. The minimum 95 m.p.h. speed corresponds to a wind pressure of 2½ times that of the 60 m.p.h. wind assumed in the Light loading district. The maximum 150 m.p.h. speed corresponds to a wind pressure of more than six times that due to the 60 m.p.h. wind. However, the corresponding overload factors for Rule 250C are lower than that of Rule 250B, somewhat reducing the wide divergence in pole strength requirements. Nonetheless, if applicable, the impact on pole strength and sizes in Florida, and on utility construction practices and costs, would be major, as discussed in detail in Section 4. For various reasons, as discussed in Section 3.1, the NESC only applies Rule 250C to structures exceeding 60 feet in height above ground. This effectively exempts the vast majority of distribution poles. For cases where both Rule 250B and 250C apply, the larger effective loads would determine the required pole strength.

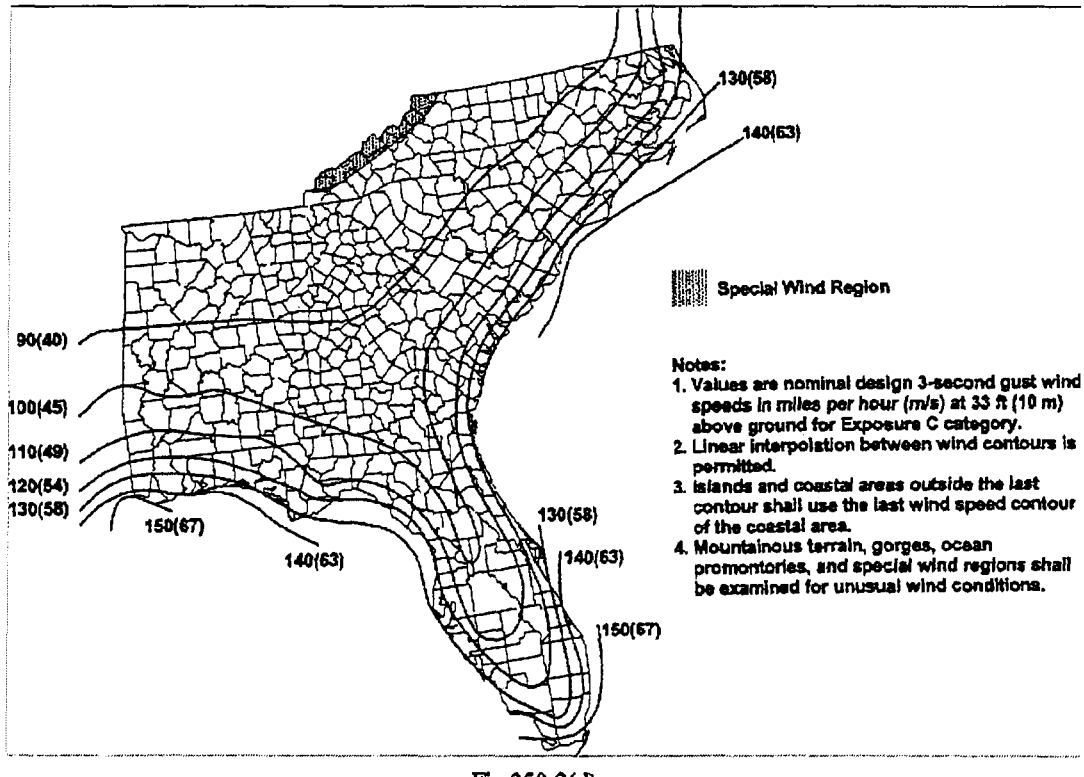

Fig 250-2(d)
Eastern Gulf of Mexico and Southeastern US Hurricane Coastline

[3] Figure 250-2(d) refers to "3-second gust wind speeds", which is approximately 20% greater than the 1-minute average wind speed used as the basis for categorizing hurricane levels by the Saffir-Simpson Hurricane Scale.

2.3 Grades of Construction

Section 24 of the NESC defines three Grades of Construction intended to distinguish between various situations, requiring varying levels of reliability, as implemented by the overload factors described above. In general, these grades depend upon the combination of voltage levels present in the power and communications conductors supported on the same poles, as well as various details, as specified. Most distribution poles carrying "primary power" (> 750 volts) at the upper portion of the pole, and communications cables below, are in the Grade C category. If the adjacent lines cross railroads tracks or limited access highways, a greater reliability level is required, corresponding to Grade B. Most power utility-owned poles are in the Grade C category.

The third grade of construction is Grade N, and applies if the voltages do not exceed 750 volts, corresponding to the lowest level of reliability.[4] This includes joint-usage poles supporting only "secondary power" (< 750 volts) or poles supporting only telecommunications cables.

The NESC does not provide specific storm loading or strength requirements for Grade N structures. NESC Section 25 (Loadings for Grades B and C) is not applicable to Grade N, and Section 26 (Rule 263) only states that "[t]he strength of Grade N construction need not be equal to or greater than Grade C" and that "[p]oles used for lines for which neither Grade B nor C is required shall be of initial size or guyed or braced to withstand expected loads, including line personnel working on them." This lack of specificity for Class N poles allows wide variability in application with respect to selecting appropriate pole strengths to withstand storms.

2.4 Required Strength & Pole Class

Based upon the wind pressures corresponding to the storm loads, as applicable, an appropriate strength pole may be selected. Wood pole sizes and strengths are specified in *ANSI O5.1, Wood Poles, Specifications and Dimensions*. ANSI-O5.1 provides a pole classification system based upon the ability of a pole to withstand lateral loads placed near the top of the pole, in a cantilever situation, such as may correspond to transverse wind loads on a pole with attachments. For example, a popular size Class 4 pole would typically (on the average) withstand a lateral load of 2,400 lbs applied 2 feet from the tip of the pole. A Class 3 pole is stronger, and would withstand 3,000 lbs. Within poles of Class 1 - 10, lower class number poles correspond to stronger (*i.e.*, larger diameter) poles. (Poles of strength greater than Class 1, are classified as H1, H2, and so on) with strength increasing with the H-number.)

Thus, a pole may be described as that supporting a specific "grade" of construction, corresponding to a level of required reliability (Grade B or C), or by a "class" size which is selected to match the strength needed to achieve the required reliability level. The strength is determined and calculated based upon the specified loading details (ice buildup and/or wind speed), the number and size (diameter) of the attachments to the pole, the span length between adjacent poles, and the grade of construction (via the overload factors discussed above).

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[4] Grade B applies if the adjacent lines cross railroads tracks or limited access highways.

3. Upcoming and Future Editions of NESC

The 2007 edition of the NESC has recently been issued (August 2006) and is effective as of February 2007. Regarding storm loadings, several significant changes were introduced. Although Rule 250B was left unchanged, a new Rule 250D was added: "Extreme Ice with Concurrent Wind Loading." Similar to Rule 250C, Extreme Wind Loading, Rule 250D would only apply to structures exceeding 60 feet in height, exempting most distribution poles. In any case, this storm load would not have an impact in Florida due to the low associated ice (0-in.) and concurrent wind (30 m.p.h.) loads.

It is particularly interesting that Rule 250C has been modified for the common Grade C construction applications. In previous editions, the overload (design) factors for Grade B and C construction were the same, in spite of the greater implied reliability for the Grade B situations. This inequity was corrected in the 2007 edition by a *reduction* of as much as 25% in the effective design loads for Grade C construction. Thus, in contrast to possibly extending the Extreme Wind Loading to a larger category of structures and applications (*e.g.*, poles ≤ 60 feet height) the NESC requirements, where applicable, have been reduced. Nonetheless, there had been extensive effort and discussions regarding the possible extension of Rule 250C to structures of all heights, as described below.

3.1 Extreme Wind Loading -- Discussions

There is a seemingly eternal debate within the NESC Committee to consider eliminating the 60-foot exemption -- so that poles of all heights would then be subject to extreme wind loading. Such a revision was discussed within the NESC Committee with regard to the 2007 edition but, once again, was rejected. In fact, as described above, where applicable -- *i.e.*, poles taller than 60 feet -- the design requirement for Extreme Wind was actually reduced in severity for Grade C construction.

The rationale for rejecting consideration of extreme winds for "distribution" poles (*i.e.*, poles < 60 feet tall) is that the vast majority of industry experiences indicate that almost all damage to such lines is caused by wind-blown debris such as falling branches, and not by the wind forces acting directly on the wires and poles. In that case, little would be gained by attempting to design such poles to withstand the direct hurricane wind forces. The NESC Loading Section (NESC Section 25) does not explicitly use the term "distribution" when referring to these applications, but the 60-foot height threshold was chosen intentionally to exclude the vast majority of such poles. (In contrast, taller structures, such as critical transmission towers, would benefit from such a requirement.) In addition, to the best of my knowledge, the NESC Committee has never discussed extending any of the storm loads of Section 25 of the NESC (*i.e.*, Combined Ice and Wind or Extreme Wind) to Grade N applications, including telecommunications-only poles or joint-use poles with only secondary power (< 750 volts). Thus, the proposal of the PSC to extend Rule 250C to all distribution poles, regardless of height or grade of construction, would appear to be a major departure from present considerations in the NESC Committee, or industry in general. Thus, it would not appear to be "reasonably practical, feasible, and cost-effective" (to quote from proposed Rule 25-6.034(5)) to attempt to apply Rule 250C to Grade N joint-use distribution poles.

Related discussions within the NESC Committee to extend the Extreme Wind loading to structures of all heights (including distribution poles), focused on a particular change proposal, developed within Working Group 5.8, that would limit the impact of such an otherwise potentially dramatic change. In particular, for the Light Loading District portion of the country, which includes Florida, there would be no impact for distribution structures. However, based upon a multitude of industry comments objecting to even this diluted version of an Extreme Wind requirement for distribution poles throughout the country, this proposed change was not incorporated into the 2007 edition. It may be expected that this (rejected) change proposal will serve as a starting point for similar considerations for the 2012 edition of the NESC.

3.2 Future NESC Meetings (2012 Edition)

Although the 2007 edition of NESC is being issued essentially as this report is being written, efforts on the development of the subsequent 2012 edition are already being anticipated by Subcommittee 5. Due to the general interest in the effects of storm loads, such as hurricanes, and the effort required to properly consider the various aspects, Subcommittee 5 typically begins its meetings considerably earlier in the code cycle than most other subcommittees. Thus, initial meetings for development of the 2012 edition probably will begin in 2007. As a precursor, Working Group 5.7 of Subcommittee 5 (chaired by myself) will hold a panel session in January 2007 for the benefit of interested members of the power industry (IEEE Power Engineering Society, TP&C Subcommittee). The panel session will address the changes adopted in the 2007 edition, but will also discuss some of the proposals that were not accepted. The proposed (rejected) changes to Rule 250C, including the proposed extension to distribution structures, will be of particular interest, and will likely generate comments to be considered in the development of the 2012 edition.

4. Impact of Extending Rule 250C

The unlimited application of Rule 250C to all poles would have a major impact on the cost and operations of the utilities and the third party attachers, and would likely significantly affect the system reliability and restoration efforts, as well as public safety -- albeit not necessarily in the manner expected by the PSC.

4.1 System Cost

For electric utility-owned joint-use Grade N, Grade B or Grade C pole applications, the additional pole costs will depend upon the extent to which the proposed Extreme Wind load would exceed "reasonable" (albeit non-mandated) Grade N loads, and the already required Combined Ice and Wind load for Grade B or C applications for poles not exceeding 60 feet in height. Any increased strength requirement leads to stronger (larger diameter) poles, or a correspondingly greater number of poles (resulting in shorter span lengths), both of which would obviously be more expensive.

Figure 1 illustrates the relative pole strength in comparison to that currently required for the common Grade C joint-usage distribution application; *e.g.*, including primary power

(> 750 volts) with telecommunications cables mounted below the power cables.[5] Assuming the pole does not exceed 60 feet in height (65 feet in length[6]), such a pole must be designed to the present Combined Ice and Wind Loading (NESC Rule 250B, Figure 250-1, Tables 250-1, 253-1 and 261-1A). For present purposes, a tangent line (no corner angles) is assumed, for which the design is based upon the ability to withstand the transverse wind loading. For Florida, located in the NESC Light Loading District (Figure 250-1), this corresponds to a wind speed of approximately 60 m.p.h., but with an additional overload/design factor of approximately 2-to-1 for Grade C, and 4-to-1 for Grade B. For Grade N, a 1-to-1 design factor is conveniently ("reasonably") assumed. For the proposed application of Extreme Wind requirements (NESC Rule 250C), the wind-speed for Florida ranges from less than 100 m.p.h. (assumed to be 95 m.p.h.) in north-central area, to as much as 150 m.p.h. at the southern tip.[7]

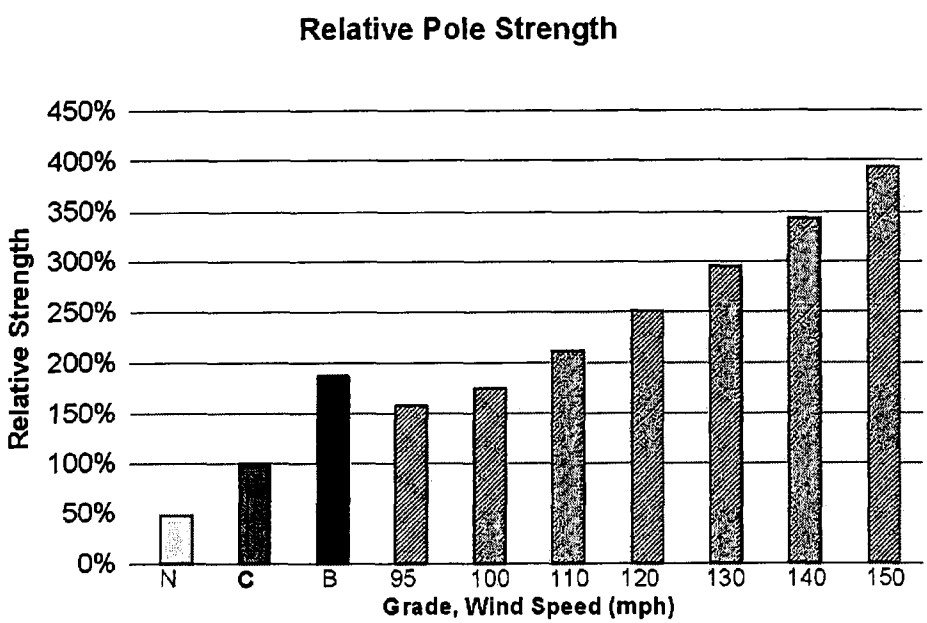

Figure 1
Relative Distribution Pole Strength vs. Typical Grade C Strength Requirements (NESC-2002)

The three solid bars to the left side of Figure 1, labeled "N", "C" and "B", depict the relative magnitude of the present required pole strength for a Grade N, Grade C, or

[5] Grade B construction would typically be limited to special situations (such as railroad crossings and limited access highways).
[6] Wood poles are available in 5 foot increments, and are buried at a depth of 10% the length plus 2 feet, with a slightly greater depth for poles shorter than 40 feet; *e.g.*, a 40-foot pole is buried at a depth of 6 feet, resulting in a 32 feet height above ground. (See ANSI-O5.1 wood pole standard.)
[7] A pole length of 40 feet is assumed. This parameter has only a minor effect on the results.

Grade B application. The seven cross-hatched bars to the right depict the relative magnitude of the required pole strength (which under the proposed rule would be the same for Grade N, C and B poles) due to Extreme Wind loads, at the wind speed indicated, should Rule 250C be directly extended to such applications. The results in Figure 1 thus show that the increased loading for an otherwise Grade C pole may be *increased* by a minimum of 50% (95 m.p.h.) or possibly as much as 300% (150 m.p.h.). In other words, the required strength, or number of poles, would be at least 1½ times -- and possibly as much as four times -- that currently required. For a Grade N pole application, the required strength would be at least three times -- and possibly as much as eight times -- a present reasonable design requirement. For the less common Grade B applications, the impact would not be realized for wind speeds less than 110 m.p.h.. Nonetheless, significant strength increases would be required for wind speeds exceeding 110 m.p.h., which are characteristic of significant portions of Florida, as shown in Figure 250-2(d).

Figure 2 illustrates the corresponding pole class that would be required, assuming a Class 4 pole is necessary for the reference Grade C application, and the same number of poles (or span length) is maintained. Similar to Figure 1, the three solid bars to the left side of Figure 2 depict the representative pole class for a Grade N, Grade C, or Grade B application. The seven cross-hatched bars to the right depict the required class pole corresponding to the PSC proposed application of the Extreme Wind loads (which would be the same for Grade N, C and B poles). A minimum increase of three class sizes (to Class 1) for Grade C would be required for the minimum 95 m.p.h. wind, and as much as eight class sizes (to Class H5) for the 150 m.p.h. case. A Class 7 pole would otherwise suffice for the Grade N construction. As above, the Grade B applications would be affected to a lesser degree, but the increased size would still be significant for wind speeds above 110 m.p.h.

The increased pole material costs, including shipping and storage, are directly related to the number of poles or pole size (class). For larger, stronger poles, increased installation costs for the heavier poles may also be anticipated. Furthermore, the availability of such larger size (diameter) poles may be an issue.

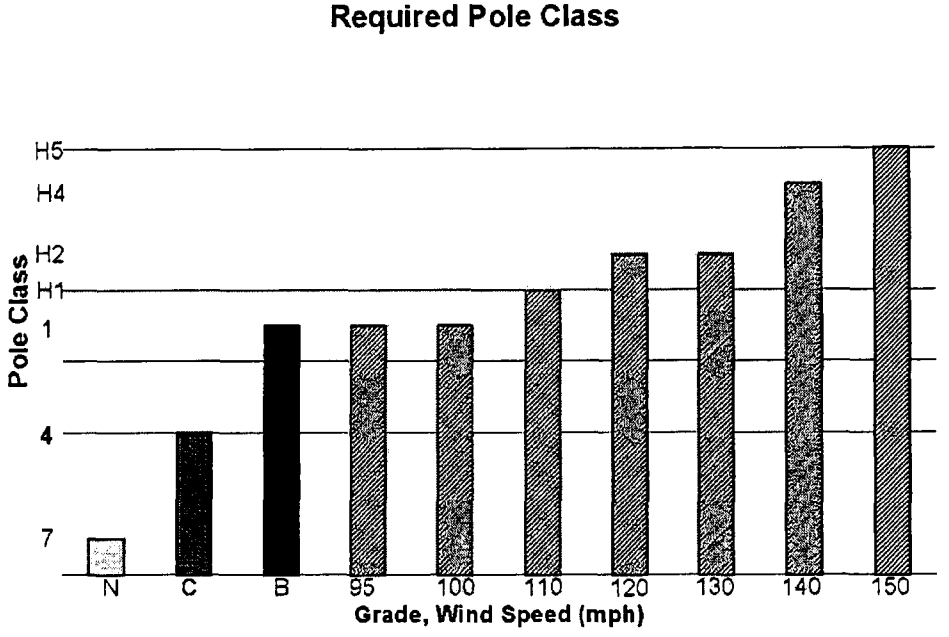

Figure 2
Required Distribution Pole Class vs. Typical Grade C Strength Requirements (NESC-2002)

4.2 Unintended Consequences

The imposition of the Extreme Wind requirement may result in unfortunate "unintended consequences," as sometimes occurs when changing long-standing practices that have generally been deemed successful. For example, as discussed above, the increased pole strength requirement would result in significantly stronger (stouter) poles or a larger number of more conventional size poles, corresponding to shorter spans. Such a practice would have a direct and negative impact on vehicular safety, and conflict with the objectives of the U.S. Department of Transportation, and presumably that of the DOTs of many states. The U.S. DOT is attempting to minimize the number of utility poles in order to reduce the incidence and severity of vehicular accidents. A greater number of poles, or stouter poles, would be contrary to such objectives. Thus, an attempt to modify a national safety code (*i.e.*, the NESC) to accomplish one objective may actually compromise public safety.

Other unintended consequences may also result from the introduction of the proposed Extreme Wind loading, due to a possible significant increase in the number of installed distribution poles along a given route. The June 8, 2006 Florida PSC Memorandum (page 5, Rollins) describes the likelihood that the supposedly less loaded individual poles would nonetheless be damaged in a hurricane, caused by the wind-blown debris and branches, resulting in the much more difficult, and time-consuming, recovery process to repair or reinstall many more poles.

Still another negative consequence relates to the engineering support associated with the implementation of the proposed Extreme Wind loads. The determination of the corresponding wind force is considerably more complicated than that of the existing transverse wind force based upon the present required Combined Ice and Wind loading. While such calculations are generally within the capability of experienced transmission engineers, with civil engineering training, they are beyond that of most distribution engineers. Indeed, one of the change proposals submitted for the 2007 edition was an attempt to simplify the engineering implementation of the Extreme Wind loads for even the applicable transmission applications. Although new or available software packages may alleviate the burden, there will be inevitable confusion and delays -- as well as possible errors in implementation -- in the design and installation of new facilities (including Verizon's fiber-optic networks), to the detriment of the consumers.

5. Recommendations

My primary recommendation is that the Commission not alter the manner in which the NESC's extreme wind loading standards are applied. The NESC is a well-respected document that is generally recognized as having served the industry and public well. For this reason, the NESC Committee (*e.g.*, Subcommittee 5, Strength & Loading) generally attempts to introduce significant changes in a gradual, evolutionary manner, in order to avoid or minimize the potential impact, including unintended negative consequences such as described above (Section 4.2). Thus, previous discussions within the NESC Committee (see Section 3.1 above) to extend the Extreme Wind loading to structures less than 60 feet tall (distribution poles), focused on a particular change proposal, developed within Subcommittee 5, that would limit the impact of such an otherwise potentially dramatic change. In particular, for the Light Loading District portion of the country, which includes Florida, the impact would have been insignificant. Nonetheless, based upon a multitude of industry comments objecting to even this diluted version of an Extreme Wind requirement for distribution poles throughout the country, this proposed change was not incorporated into the 2007 edition of the NESC.

Ideally, the Florida PSC should wait until the next code cycle of the NESC (2012 edition) before encouraging or requiring consideration of the NESC Extreme Wind loading. The related discussions within the NESC Committee during the development process would take into account the experiences during Hurricane Wilma, as well as other recent serious storms. Florida Power & Light, in particular, is well-represented on NESC Subcommittee 5. If the Florida PSC decides to change how the NESC's Extreme Wind loading standards are applied, it should be very cautious in the manner in which such a dramatic, controversial change is introduced. At the least, the Commission should attempt to limit the otherwise dramatic impact to as small a category of facilities as possible, or to reduce the magnitude of the impact. Thus, my alternative recommendation, in the event the Commission moves in this direction, is as follows:

- The proposed PSC rule should limit its scope to Grade B or Grade C applications of electric-only or joint-use poles owned by the electric utilities. Thus, Grade N applications -- which include joint-use poles with only secondary power (< 750

volts), as well as several categories of electric-only poles -- should be explicitly excluded from the proposed application of Rule 250C.

- The application of the NESC Extreme Wind load, as presently specified in NESC-2002, Rule 250C, should be modified to limit the quantitative impact to the affected distribution poles. For example, the reduced loads for Grade C construction incorporated into the latest (2007) edition of the NESC should be explicitly cited as consistent with the intent of PSC Rule 25-6034. For Grade C construction, the corresponding wind forces are reduced by as much as 25% compared to NESC-2002. NESC-2007 is being issued in August 2006, and is effective within six months (February 2007).
- The proposed PSC rule, preferably as modified above, should be applied on a trial basis, initially limited to a specified geographic area and a defined period (*e.g.*, 1-2 years), in order to better understand the potential benefits and consequences of such a rule.

Dr. Lawrence M. Slavin
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Rockaway , NJ 07866
Phone: 1-973-983-0813
fax: 1-973-983-0813
email: lslavin@ieee.org
www.outsideplantconsulting.com

APPENDIX 2
About Outside Plant Consulting Services, Inc. (OPCS)
(Dr. Lawrence M. Slavin)

Outside Plant Consulting Services, Inc. (OPCS) was established in the year 2002 to help meet the needs of the telecommunications and power industries in establishing standards, guidelines and practices for outside plant facilities and products. The OPCS Group provides related support services for field deployment, and product evaluation and analysis. Dr. Lawrence (Larry) M. Slavin, Principal of OPCS, has extensive experience and expertise in such activities, based upon his many years of service at AT&T/Lucent Bell Telephone Laboratories (Distinguished Member of Technical Staff) in telecommunications product design and development, followed by a career at Telcordia Technologies (Bellcore) in its research and professional service organizations.

As Principal Consultant and Manager/Director of the Network Facilities, Components, and Energy Group at Telcordia, Dr. Slavin was responsible for professional services related to the telecommunications industry. These activities included technical leadership in developing installation and construction practices and "generic requirements" documents, introducing new construction methods, and performing analyses on a wide variety of technologies and products (such as poles, duct, wire and cable, electronic equipment cabinets, flywheel energy storage systems and turbine-generators). Throughout his long career, he has had a leading role in the evolution of many telecommunications related fields and disciplines -- including aerial and buried plant design and reliability; advanced construction and cable and duct placement techniques; copper pair, coaxial, and fiber-optic technology; flywheel energy storage systems; physical design and development of hardware and electronic and electro-optic systems (such as the "SLC 96" digital loop carrier); cable media and equipment reliability studies; exploratory fiber-optic hardware development; and systems engineering.

Dr. Slavin is a member of several subcommittees of the National Electrical Safety Code Committee, responsible for specifying safety standards for aerial and buried telecommunications and power facilities in the United States. He is also an active member and participant on the Accredited Standards Committee ASC-O5 ("ANSI-O5") for wood poles and products, as well as on several related committees of the American Society of Civil Engineers. In addition, Dr. Slavin is a Charter Member of the North American Society for Trenchless Technology, has been instrumental in the development of directional drilling standards, and directly supports training activities for the directional drilling industry at the Center for Underground Infrastructure and Research and Education (CUIRE) at Michigan State University. Specific present and recent industry activities are listed below.

Industry Activities

- **National Electrical Safety Code Committee**
  - Represents the national telephone industry, via Alliance for Telecommunications Industry Solutions, ATIS
  - Executive Subcommittee
  - Main Committee
  - Subcommittee 4 (Overhead Lines – Clearances)
  - **Subcommittee 5 (Overhead Lines – Strength & Loading)**
  - Subcommittee 7 (Buried Lines)
- **Accredited Standards Committee ASC-O5**
  - ***ANSI O5.1, Wood Poles, Specifications and Dimensions***
  - *ANSI O5.2, Wood Products, Structural Glued Laminated Timber for Utility Structures*
  - *ANSI O5.3, Wood Products, Solid Sawn-Wood Products and Braces*
- **Pole Reliability Based Design (RBD) Committee, ASCE**
  - ***Reliability-Based Design of Utility Pole Structures***
- **Distribution Pole Standard Committee, ASCE**
- Committee F17 on Plastic Piping Systems, ASTM
  - Subcommittee F17.67 on Trenchless Plastic Pipeline Technology
  - Task Group Leader for development of HDD Standard ASTM F1962
  - *ASTM F1962, Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings*
- Trenchless Installation of Pipelines (TIPS) Committee, ASCE
  - *ASCE Manual of Practice for Pipe Bursting Projects*
- Center for Underground Infrastructure and Research and Education (CUIRE) at Michigan State University
  - Industry Advisory Board
- Trenchless Technology Center, Louisiana Tech University
  - Industry Advisory Board
- North American Society for Trenchless Technology (NASTT)
  - Charter Member
  - Chair of Directional Drilling Subcommittee
- Missouri Western State College
  - HDD Steering Committee

PROCESS TO ENGAGE
THIRD PARTY ATTACHERS

1. The electric utility and third-party attachers will engage in a continuous dialogue on the status of the electric utility's storm hardening plans. A third-party attacher that wishes to be part of this process ("Participant") shall provide notification in writing to the electric utility, providing the name and address of the person designated to receive communications from the electric utility. The electric utility may, no more than once a year, request that Participants confirm that they wish to continue being part of the process and update the name and address of the person designated to receive communication.

2. By September 5 of each year, the electric utility shall provide the Participants with a list of the projects identified in the electric utility's approved storm hardening plan on file with the Commission ("Plan") that the electric utility proposes to undertake in the following calendar year, pending internal budget approval. The electric utility shall provide the Participants with a list of such projects receiving final budget approval promptly as it becomes available.

3. Prior to engineering a job relative to a storm hardening project identified in its Plan, the electric utility shall initiate a meeting with Participants to discuss the electric utility's preliminary ideas for the scope of work ("Pre-Design Meeting"). At the Pre-Design Meeting, the electric utility shall (a)

identify the poles involved; (b) identify whether the electric utility plans to replace poles, change from wood poles to poles of another material (*e.g.*, steel or concrete), place poles in locations different from the existing poles, relocate overhead facilities or underground existing aerial facilities, and; (c) provide the projected commencement date; (d) upon request by a Participant, provide other available information that would enable the Participants to make necessary preparations and evaluate whether to seek dispute resolution pursuant to Rule 25-6.0342(7). During this pre-design phase of a project, the electric utility shall also seek input from Participants as required by Rule 25-6.0342(6).

4. The electric utility shall provide Participants with final engineering plans promptly upon completion. Prior to beginning construction, the electric utility shall initiate a meeting with Participants to discuss coordination of work and a construction schedule.

5. Information submitted to Participants pursuant to section 2, 3 or 4 above regarding projects identified in the electric utility's Plan will not be docketed unless a protest is filed in accordance with Rule 25-6.0342(7), or it is otherwise deemed necessary by the Commission.

6. If the electric utility seeks to amend its Plan by, for example, adding a project not previously identified in its Plan, it shall file a petition with the Commission requesting that the Plan be modified in accordance with Rule 25-6.0342(2).

7. The electric utility will file with the Commission by March 1 each year a status report of its implementation of its Plan. Included in this status report shall be the name of storm hardening projects commenced and/or completed by the electric utility, the routes and circuits affected, and any comments on the project received from third-party attachers.

PROCESS TO ENGAGE THIRD PARTY ATTACHERS

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3. Prior to engineering a job relative to a storm hardening project identified in its Plan, the electric utility shall initiate a meeting with Participants to discuss the electric utility's preliminary ideas for the scope of work ("Pre-Design Meeting"). At the Pre-Design Meeting, the electric utility shall (a)

FLORIDA PUBLIC SERVICE COMMISSION
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COMPANY FCTA (Direct)
WITNESS Michael T. Harrison (MTH-3)
DATE 10/02-03/07

identify the poles involved; (b) identify whether the electric utility plans to replace poles, change from wood poles to poles of another material (*e.g.*, steel or concrete), place poles in locations different from the existing poles, relocate overhead facilities or underground existing aerial facilities, and; (c) provide the projected commencement date; (d) upon request by a Participant, provide other available information that would enable the Participants to make necessary preparations and evaluate whether to seek dispute resolution pursuant to Rule 25-6.0342(7). During this pre-design phase of a project, the electric utility shall also seek input from Participants as required by Rule 25-6.0342(6).

4. The electric utility shall provide Participants with final engineering plans promptly upon completion. Prior to beginning construction, the electric utility shall initiate a meeting with Participants to discuss coordination of work and a construction schedule.

5. Information submitted to Participants pursuant to section 2, 3 or 4 above regarding projects identified in the electric utility's Plan will not be docketed unless a protest is filed in accordance with Rule 25-6.0342(7), or it is otherwise deemed necessary by the Commission.

6. If the electric utility seeks to amend its Plan by, for example, adding a project not previously identified in its Plan, it shall file a petition with the Commission requesting that the Plan be modified in accordance with Rule 25-6.0342(2).

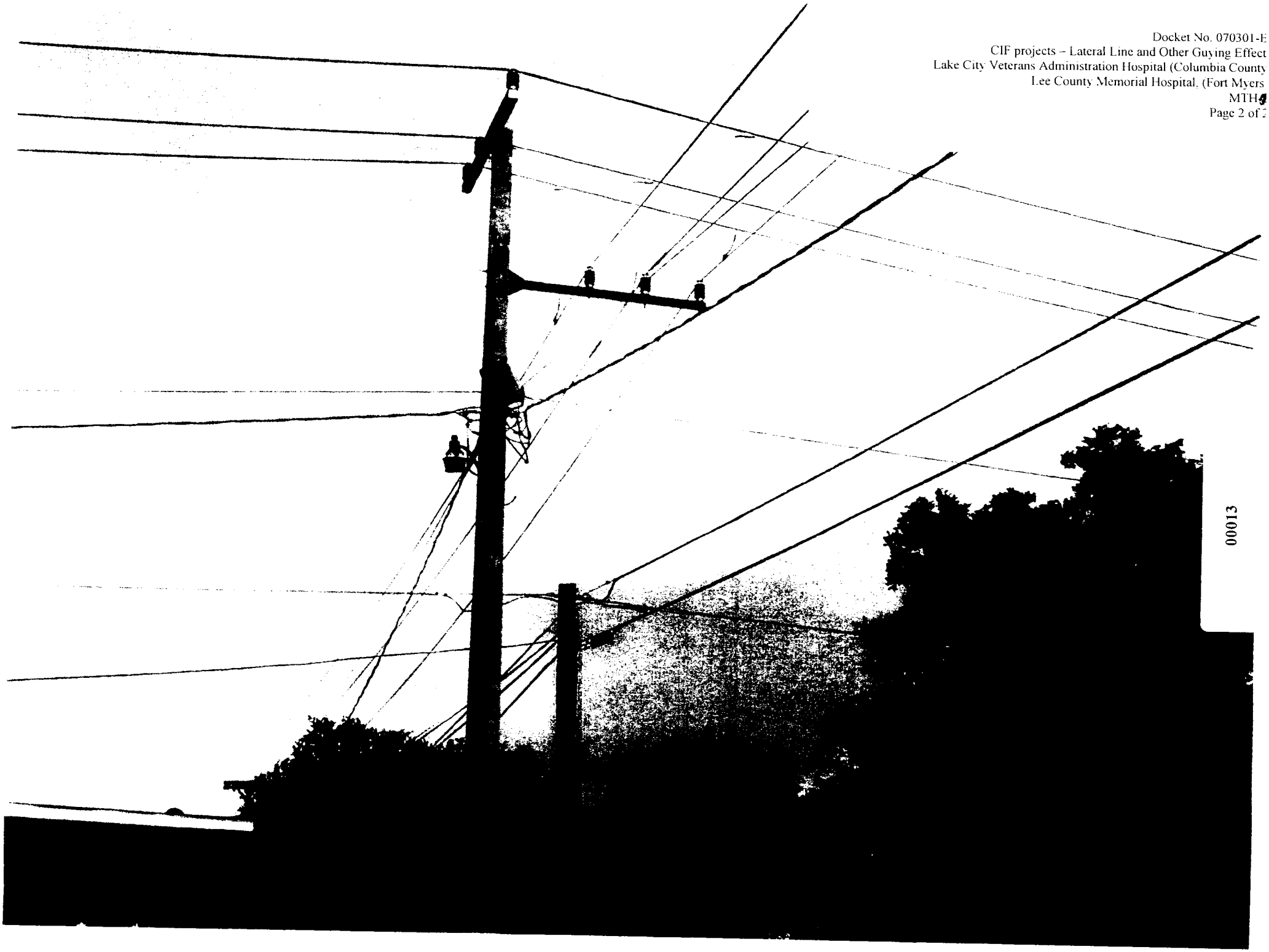
7. The electric utility will file with the Commission by March 1 each year a status report of its implementation of its Plan. Included in this status report shall be the name of storm hardening projects commenced and/or completed by the electric utility, the routes and circuits affected, and any comments on the project received from third-party attachers.

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. _____ EXHIBIT #31 Not Admitted
COMPANY _____
WITNESS _____
DATE 10/02-03/07

Exhibit 32 - MTH-5 - CIF projects - Lateral Line and Other Guying Effects, Lake City Veterans Hospital (Columbia County) - this is a photo, consisting of 2 pages. (This was originally labeled as MTH-2 in Docket No. 070301)

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI EXHIBIT 32
COMPANY FCTA (Direct)
WITNESS Michael T. Harrelson (MTH-5)
DATE 10/02-03/05

00012

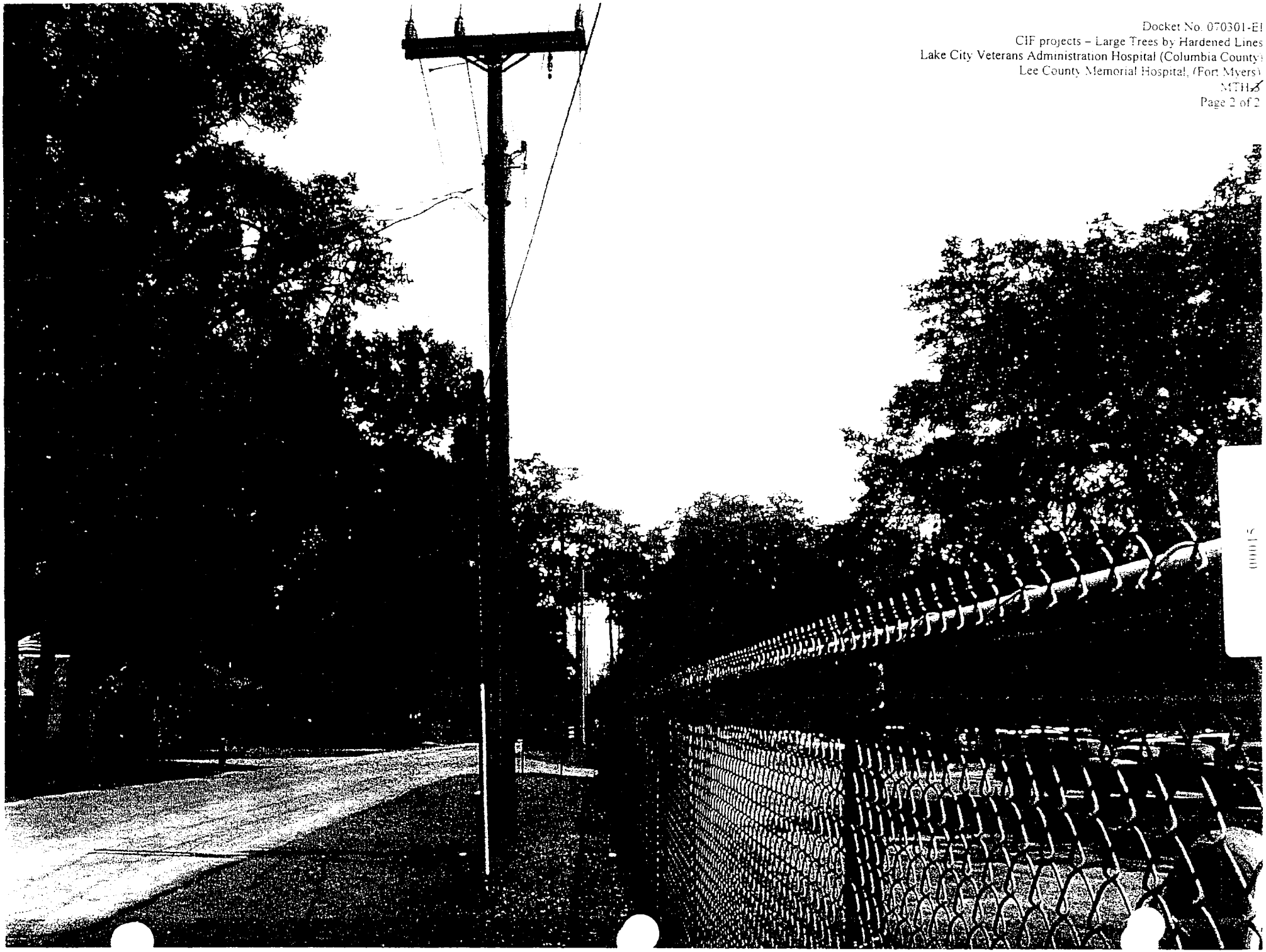


00013

Exhibit 33 - MTH-6 - CIF projects - Large Trees by Hardened Lines, Lake City Veterans Administration Hospital - this is a photo, consisting of 2 pages. (This was originally labeled as MTH-3 in Docket NO. 070301)

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI **EXHIBIT** 33
COMPANY FCTA (Direct)
WITNESS Michael T. Harrelson (MTH-6)
DATE 10/02 & 03/07

000114



FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI EXHIBIT 34
COMPANY PCR (Direct)
WITNESS Peter J. Rant, P.E. (PJR-1)
DATE 10/02 & 03/07

Utility Engineering

Engineering Services For Utilities®

PETER J. RANT, PE
VICE-PRESIDENT

PROFESSIONAL EDUCATION:

CLARKSON UNIVERSITY, Potsdam, NY
BS - Electrical & Computer Engineering, 1990
Concentration in Power Systems

REGISTRATION:

Professional Engineer: North Carolina, Virginia, Maryland, Tennessee, Florida, Ohio, Arizona, District of Columbia

EXPERIENCE:

2005-Present

Vice President
UTILITYENGINEERING, INC.
Wake Forest, North Carolina

Responsible for leadership and direction of staff completing design and management of power delivery projects. Develops projects from concept through completion. Responsible for staffing, budgeting, scheduling, and contractual agreements related to design and construction.

Allocates resources, develops partnering and subcontracting relationships, and directs bidding and other procurement methods to complete projects. Maintains professional engineering responsibilities over designs, studies, and reports, consistent with the work listed below.

Maintains availability to clients around the clock, seven days a week, to ensure engineering needs are met. Establishes and monitors Utility Engineering standards and priorities of work to meet or exceed client expectations.

2005

Operations Manager-Transmission & Distribution and Geographic Information & Technology
BOOTH & ASSOCIATES, INC., Consulting Engineers
Raleigh, North Carolina

Responsible for the daily operations and resource allocation for the largest division at Booth & Associates, Inc. Worked with Division Vice Presidents developing annual division budget and performance goals. Tracked project budgets and directed department and project managers to meet fiscal targets and project schedules.

Maintained relationships with diverse base of clients and vendors to develop engineering and design/build (EPC) projects. Developed studies and cost proposals supporting clients' technical and fiscal requirements. Designed, bid, and managed multiple construction projects.

PETER J. RANT, PE
(Continued)

Continuing professional engineering responsibilities for an array of projects. Project experience includes: design of 18 miles of static overhead ground wire replacement on a 69 kV Transmission System with Optical Ground Wire (OPGW), successful completion of a 3-year FEMA funded hurricane hazard mitigation project converting 88 miles of overhead distribution line to underground (approximate value of 15 million dollars), complete replacement and upgrade of a university medium voltage electric system, including station breakers, in two phases with a total project cost of 3.5 million dollars, and complete update of the TVPPA Design Guidelines for Transmission and Distribution.

1999-2005 Manager of Distribution Design
BOOTH & ASSOCIATES, INC., Consulting Engineers
Raleigh, North Carolina

Managed Electric Distribution Department for a seventy person electric utility engineering consulting firm; Responsible for distribution design standards and quality control of engineered solutions. Engineer of Record and Senior Project Manager for multiple projects. Directed engineers and technicians completing all design and management activities required for construction of multimillion-dollar capital projects. Developed new business through client contact, marketing efforts, and preparation of engineering proposals. Negotiated design and construction contracts.

Designed overhead and underground electric transmission and distribution facilities; Responsible for project scheduling and coordination, design calculations, field staking, right-of-way acquisition, permitting, and construction management of multiple projects. Prepared specifications, bid documents, labor and material contracts, construction cost estimates, various permit applications, construction drawings, design data books, design and construction standards manuals, Federal and State forms and reports, and system studies for municipalities, Investor Owned Utilities, Rural Electric Cooperatives, schools and universities, military bases and other owners of high and medium voltage electric systems.

Experience includes: major system improvement and revenue projects, voltage conversions, installation of metering, DOT relocations, roadway and decorative lighting, overhead and underground 69 kV transmission, substation upgrades, military base system privatizations, GPS/GIS mapping, system valuations, infrared inspections, and alternative materials specifications.

PETER J. RANT, PE
(Continued)

Specialized in complex underground construction projects for aesthetics and reliability including downtown streetscape enhancement and university campus electric and telecommunication systems.

Other Positions:

Project Manager	1997-1999
Junior Engineer	1994-1997

1994-1999 **BOOTH & ASSOCIATES, INC.**, Consulting Engineers
Raleigh, North Carolina

Design and project management activities consistent with the experience listed above.

1990-1994 **UNITED STATES ARMY**, Fort Bragg, North Carolina.
First Lieutenant; Signal Operations Officer

Responsible for communications and site power for deployed Special Forces and major Joint Special Operations headquarters. Designed and supervised installation of communications networks and remote mobile power generation and distribution systems and serving base camps in Central America and the United States. Supervised up to 100 people installing and maintaining radio, telephone, and satellite communications systems during exercises and missions worldwide. Communications systems included single and multichannel HF, UHF, and SHF radios in point to point and point to multipoint secure voice and data networks as well as wireline systems. Employed technologies including spread spectrum radio, automatic link establishment (ALE), and Microsoft Windows based LAN's and WAN's.

Design of communications networks included selection and assignment of frequencies and antennas for wireless connections based on propagation analysis. Responsibilities also included allocation of bandwidth for trunked and dedicated channels, and assignment of individual subscriber priorities and privileges. Directed installation and troubleshooting of multiple layered networks.

Led individual and group training resulting in unit's 100% mission accomplishment in numerous deployments despite high personnel turnover. Responsible for maintenance and accountability of up to 5 million dollars worth of vehicles, generators, and communications equipment as well as control of classified documents and cryptographic materials.

PETER J. RANT, PE
(Continued)

Positions Held:	Signal Detachment Commander	1992 to 1994
	Platoon Leader	1991 to 1992
	(Military Training Schools)	1990 to 1991

MILITARY ACHIEVEMENTS:

Excelled academically graduating second in a class of eighty-four officers in the Signal Officer Basic Course, and in the top five at the Battalion/Brigade Signal Officer Course. These courses comprise nine months of training covering design, installation, and maintenance of military communications and power systems. Military training certifications include Parachutist, Senior Parachutist, Jumpmaster, Battalion/Brigade Signal Officer, Airlift Loadplanner, Range Operations and Ammunition Handling, and Substance Abuse Prevention and Control. Awarded Army Commendation Medal with Oak Leaf Cluster for meritorious service in the 7th Special Forces Group (Airborne) and the 112th Signal Battalion (Special Operations)(Airborne)

PROFESSIONAL AFFILIATIONS:

Institute of Electrical and Electronic Engineers (IEEE)
National Society of Professional Engineers (NSPE/PENC)
Society of American Military Engineers (SAME)

Tropical Cyclone Report
Hurricane Dennis
4 – 13 July 2005

Jack Beven
National Hurricane Center
22 November 2005
Updated for deaths, damages, forecast errors, and Jamaican data 17 March 2006

Hurricane Dennis was an unusually strong July major hurricane that left a trail of destruction from the Caribbean Sea to the northern coast of the Gulf of Mexico.

a. Synoptic History

Dennis formed from a tropical wave that moved westward from the coast of Africa on 29 June. The system began to organize on 2 July with the formation of a broad area of low pressure with two embedded swirls of low clouds. Convection increased near both low-level centers on 3 July. The western system moved through the southern Windward Islands on 4 July and lost organization over the southeastern Caribbean. The eastern system continued to develop, becoming a tropical depression over the southern Windward Islands near 1800 UTC 4 July. The "best track" chart of Dennis' path is given in Fig. 1, with the wind and pressure histories shown in Figs. 2 and 3, respectively. The best track positions and intensities are listed in Table 1.

The depression initially moved westward. It turned west-northwestward on 5 July as it became a tropical storm. Dennis reached hurricane strength early on 7 July, then rapidly intensified into a Category 4 hurricane with winds of 120 kt before making landfall near Punta del Ingles in southeastern Cuba near 0245 UTC 8 July. During this intensification, the central pressure fell 31 mb in 24 h.

Dennis weakened to a Category 3 hurricane while passing across southeastern Cuba. Once offshore in the Gulf of Guacanayabo, the hurricane moved west-northwestward parallel to the south coast of Cuba and again intensified to Category 4 status. Maximum sustained winds reached a peak of 130 kt at 1200 UTC 8 July, then decreased to 120 kt before Dennis made landfall near Punta Mangles Altos, Cuba near 1845 UTC that day. Dennis then traversed a long section of western Cuba before emerging into the Gulf of Mexico just east of Havana around 0900 UTC 9 July. Dennis weakened significantly over Cuba, with the maximum sustained winds decreasing to 75 kt by the time the center left the island.

Dennis gradually intensified for the next 6-12 h over the Gulf of Mexico, then began another cycle of rapid intensification near 1800 UTC 9 July, accompanied by a turn toward the north-northwest. During this intensification, the central pressure fell 37 mb in 24 h, including 20 mb in 6 h and 11 mb in 1 h 35 min. Maximum sustained winds reached a third peak of 125 kt near 1200 UTC 10 July. Thereafter, weakening occurred, likely due to mid/upper-level dry air from the western Gulf of Mexico entrained into the hurricane. The maximum sustained winds

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI **EXHIBIT** 35
COMPANY PCB (Direct)
WITNESS Peter J. Rant (PJR-2)
DATE 10/02+03/07

decreased to 105 kt and the central pressure rose to 946 mb before Dennis made landfall on Santa Rosa Island, Florida, between Navarre Beach and Gulf Breeze, about 1930 UTC 10 July.

Dennis continued north-northwestward after landfall, with the center moving across the western Florida Panhandle into southwestern Alabama before it weakened into a tropical storm. It became a depression as it moved into east-central Mississippi on 11 July. The cyclone turned northward later that day and northeastward on 12 July as it moved into the Ohio Valley. On 13 July, Dennis weakened to a low pressure area, which meandered over the Ohio Valley through 15 July. The Dennis-low accelerated northeastward on 16 July and was absorbed into a larger low over northwestern Ontario on 18 July.

b. Meteorological Statistics

Observations in Dennis (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the U. S. Air Force Weather Agency (AFWA), as well as flight-level and dropwindsonde observations from flights of the 53rd Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command and the NOAA Aircraft Operations Center. Microwave satellite imagery from NOAA polar-orbiting satellites, the NASA Tropical Rainfall Measuring Mission (TRMM), the NASA QuikSCAT, the NASA Aqua, and Defense Meteorological Satellite Program (DMSP) satellites were also useful in tracking Dennis.

The 53rd Weather Reconnaissance Squadron made 43 center fixes on Dennis, with the NOAA aircraft contributing an additional 10 fixes. The maximum flight-level winds measured by the aircraft at 700 mb were 150 kt at 1325 UTC 8 July. Additionally, the aircraft measured 700 mb flight-level winds of 134 kt at 2314 UTC 7 July and 140 kt at 0801 UTC 10 July. Dropsondes in the eyewall of Dennis reported 116-kt surface winds at 1515 UTC 10 July and 114 kt at 1705 UTC 8 July. The minimum aircraft-reported central pressure was 930 mb at 1143 UTC 10 July, with a 937 mb pressure measured at 1517 UTC 8 July. The last aircraft-reported pressure near landfall was 946 mb at 1930 UTC 10 July.

Ship reports of winds of tropical storm force associated with Dennis are given in Table 2, and selected surface observations from land stations and data buoys are given in Table 3.

Dennis brought hurricane conditions to portions of southeastern Cuba, and to a swath through central and western Cuba (Table 3). Cabo Cruz reported 116-kt sustained winds with a gust to 129 kt at 0200 UTC 8 July, with a minimum pressure of 956 mb at 0240 UTC just before the eye passed over the station. The anemometer was destroyed, and it is possible more extreme winds occurred. Unión de Reyes reported sustained winds of 96 kt with a gust to 107 kt at 2350 UTC 8 July, and there are numerous other reports of sustained hurricane-force winds.

Dennis also brought hurricane conditions to portions of the western Florida Panhandle and southwestern Alabama. An instrumented tower run by the Florida Coastal Monitoring Program (FCMP) at Navarre measured 1-min average winds (5-m elevation) of 86 kt and a gust to 105 kt at 1921 UTC 10 July. This tower was a few miles east of the radius of maximum

winds. Another FCMP tower at the Pensacola Airport measured 1-min average winds (10-m elevation) of 71 kt with a gust to 83 kt just west of the eye at 1946 UTC. A Florida Automated Weather Network station at Jay reported sustained winds of 62 kt at 1845 UTC.

While hurricane-force winds associated with Dennis covered only a small area near the eye, the hurricane had a large cyclonic envelope with tropical storm-force winds extending well to the east of the center over southern Florida and the Florida Panhandle. The Coastal Marine Automated Station (C-MAN) at Sand Key, Florida, reported 10-min average winds (13.1-m elevation) of 54 kt with a gust to 68 kt at 0820 UTC 9 July, while the C-MAN station at Sombrero Key, Florida, reported 2-min average winds (48.5-m elevation) of 64 kt with a gust of 76 kt at 0800 UTC 9 July. A National Ocean Service station at Panama City Beach, Florida, reported 6-min average winds (6.1-m elevation) of 51 kt with a gust to 63 kt at 1800 UTC 10 July. Tropical storm conditions also occurred over the metropolitan areas of southeastern Florida, elsewhere along the Florida west coast and the Florida Big Bend region, over portions of southwestern Alabama, and across Jamaica. Wind gusts to tropical-storm force occurred as far inland as eastern Mississippi and as far west as southeastern Louisiana.

Shipping avoided the intense core of Dennis. The highest marine wind was 56 kt at 2300 UTC 8 July from the **Caribbean Princess**.

The lowest official pressure from any land station was 956 mb at Cabo Cruz, Cuba, at 0240 UTC 8 July. The FCMP tower at the Pensacola Airport measured a pressure of 956.3 mb at 1943 UTC 10 July, while the FCMP tower in Navarre measure a pressure of 965.2 mb at 1909 UTC that day. A storm chaser in Pace, Florida, measured an unofficial pressure of 945 mb at 1910 UTC 10 July as the eye passed over.

Dennis produced a storm surge of 6-7 ft above normal tide levels on Santa Rosa Island near where the center made landfall. This surge overwashed Santa Rosa Island near and west of Navarre Beach. A storm surge of 6-9 ft above normal tide levels occurred in Apalachee Bay, Florida, which inundated parts of the town of St. Marks and other nearby areas (Figure 4). This surge was higher than currently known wind reports would support for that area, and roughly 3.5 ft higher that the surge forecast from the Sea, Lake, and Overland Surge from Hurricanes (SLOSH) model. This surge was likely triggered by an oceanic trapped shelf wave that propagated northward along the Florida west coast. Modeling results from the Center for Ocean-Atmospheric Prediction Studies at Florida State University suggest that although Dennis was roughly 150 n mi west of the area, this remotely generated sea-level rise added 3-4 ft to the surge in and around Apalachee Bay. (Reference: Personal communication with James O'Brien, Steve Morey, and Dimitri Dukhovskoy, COAPS, FSU.) A storm surge of 4-6 ft occurred elsewhere in the Florida Panhandle. Storm surges of 3-5 ft above normal tide levels occurred elsewhere along the Florida west coast, in the Florida Keys, and along the coast of Alabama. Tides of 2-4 ft above normal were reported along the coasts of Mississippi and southeastern Louisiana. Storm surge data from Cuba are currently not available.

Dennis produced widespread heavy rainfall over Cuba. Topes de Collantes reported a 24-h total of 27.67 in, while Las Piedra reported a 24-h total of 15.13 in. Storm totals for both places were likely higher. Rainfalls of 6-12 in were reported from other Cuban stations. Very

heavy rains also occurred in Jamaica, where Mavis Bank reported a storm total of 24.54 in and Shirley Castle reported a total of 23.27 in (Table 4). In the United States, Dennis produced widespread heavy rainfall along the track from the western Florida Panhandle to the Ohio Valley, and east of the track in Georgia and the remainder of Florida. A station 10 miles northwest of Camden, Alabama, reported a storm total rainfall of 12.80 in, while Monticello, Florida, reported 6.95 in (Table 4).

So far, Dennis is known to have caused nine tornadoes in Florida and one in Georgia. All were rated F0 except for an F1 near Bradenton, Florida. Additionally, numerous strong squalls occurred in the outer bands of Dennis over southern Florida. These produced a gust of 73 kt at the Fowey Rocks C-MAN station and a gust of 63 kt at Chekika in southern Miami-Dade County.

c. Casualty and Damage Statistics

Reports from Meteorological Service of Jamaica and the media indicate Dennis is directly responsible for 42 deaths – 22 in Haiti, 16 in Cuba, 3 in the United States, and 1 in Jamaica. The fatalities in the U. S. included a drowning on a sunken boat in the Florida Keys, a drowning in rough surf at Dania Beach, Florida, and a man crushed by a falling tree near Atlanta, Georgia. Dennis was also indirectly responsible for twelve deaths in Florida – two from electrocution, two from carbon monoxide poisoning, four from automobile accidents, two accidental falls during clean-up, and two cases of natural causes exacerbated by storm stress.

The American Insurance Services Group estimates the insured property damage in the United States at $1.115 billion. Based on a doubling of this figure to account for uninsured property damage, the total U. S. damage estimate for Dennis is $2.23 billion. The Meteorological Service of Jamaica estimates the damage from Dennis at 1.9 billion Jamaican dollars (approximately $31.7 million U. S. dollars).

d. Forecast and Warning Critique

Average official track errors (with the number of cases in parentheses) for Dennis were 25 (26), 36 (26), 51 (26), 61 (26), 65 (22), 74 (18), and 154 (14) n mi for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. These errors are significantly lower than the average official track errors for the 10-yr period 1995-2004[1] (42, 75, 107, 138, 202, 236, and 310 n mi, respectively), (Table 5). These errors were also lower than the corresponding track forecast errors for the vast majority of the guidance, as none of the models consistently outperformed the official forecasts.

Average official intensity errors were 11, 18, 16, 16, 23, 16, and 37 kt for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. For comparison, the average official intensity errors over the 10-yr period 1995-2004 are 6, 10, 12, 15, 18, 20, and 22 kt, respectively. The

[1] Errors given for the 96 and 120 h periods are averages over the four-year period 2001-4.

relatively large intensity errors mainly resulted from underforecasting how quickly Dennis would intensify over both the Caribbean and the Gulf of Mexico.

Table 6 gives the watches and warnings associated with Dennis.

Acknowledgements

Much of the data for this report was supplied by the National Weather Service WFOs in Key West, Miami, Tampa, and Tallahassee FL, Mobile, AL, and Slidell, La, as well as by the Meteorological Service of Jamaica. Additional data was provided by the University of South Florida Coastal Ocean Monitoring and Prediction System (COMPS) and the Florida Automated Weather Network (FAWN). NOAA buoy and C-MAN data were provided by the National Data Buoy Center. NOS data were provided by the NOAA National Ocean Service. Remote Automated Weather Stations (RAWS) data were provided by the National Interagency Fire Center. United States Geological Survey (USGS) data were provided by the NWISWeb web site. Supplementary rainfall data and portions of the remnant low track were provided by David Roth of the Hydrometeorological Prediction Center. Several of the unofficial observations were obtained from the Weather Underground web site. Jennifer Pralgo of the TPC Storm Surge unit provided the storm surge figure.

Table 1. Best track for Hurricane Dennis, 4 – 13 July 2005.

Date/Time (UTC)	Latitude (EN)	Longitude (EW)	Pressure (mb)	Wind Speed (kt)	Stage
04 / 1800	12.0	60.8	1010	25	tropical depression
05 / 0000	12.2	62.5	1009	30	"
05 / 0600	12.5	64.2	1008	30	"
05 / 1200	13.0	65.9	1007	35	tropical storm
05 / 1800	13.6	67.3	1005	40	"
06 / 0000	14.3	68.5	1000	45	"
06 / 0600	14.7	69.7	995	50	"
06 / 1200	15.1	70.9	991	55	"
06 / 1800	15.6	71.9	989	60	"
07 / 0000	16.2	73.0	982	70	hurricane
07 / 0600	16.7	74.1	972	80	"
07 / 1200	17.6	74.9	967	90	"
07 / 1800	18.5	76.1	957	100	"
08 / 0000	19.4	77.1	951	120	"
08 / 0600	20.3	78.4	953	110	"
08 / 1200	20.9	79.5	938	130	"
08 / 1800	22.0	80.6	941	120	"
09 / 0000	22.7	81.6	960	100	"
09 / 0600	23.4	82.5	973	75	"
09 / 1200	24.3	83.4	967	80	"
09 / 1800	25.2	84.2	962	90	"
10 / 0000	26.1	85.0	942	110	"
10 / 0600	27.2	85.8	935	125	"
10 / 1200	28.5	86.3	930	120	"
10 / 1800	29.9	86.9	942	110	"
11 / 0000	31.5	87.7	970	45	tropical storm
11 / 0600	32.6	88.5	991	30	tropical depression
11 / 1200	33.9	88.8	997	25	"
11 / 1800	35.3	89.1	1002	20	"
12 / 0000	36.4	89.2	1003	20	"
12 / 0600	37.1	89.0	1005	15	"
12 / 1200	37.7	88.7	1007	15	"
12 / 1800	38.1	88.3	1008	15	"
13 / 0000	38.5	87.8	1009	15	"
13 / 0600	38.9	87.2	1010	15	"
13 / 1200	39.2	86.5	1010	15	remnant low
13 / 1800	39.2	85.8	1010	15	"
14 / 0000	39.2	85.7	1009	10	"
14 / 0600	39.0	85.6	1009	10	"
14 / 1200	38.7	85.6	1010	10	"
14 / 1800	38.4	85.6	1010	10	"

15 / 0000	38.1	85.9	1009	10	"
15 / 0600	37.9	86.2	1010	10	"
15 / 1200	38.1	86.4	1012	10	"
15 / 1800	38.4	86.6	1012	10	"
16 / 0000	38.6	86.8	1011	10	"
16 / 0600	39.4	86.5	1013	10	"
16 / 1200	40.2	86.2	1014	10	"
16 / 1800	40.8	85.2	1014	10	"
17 / 0000	41.3	84.1	1013	10	"
17 / 0600	42.2	83.2	1013	10	"
17 / 1200	43.1	82.3	1013	10	"
17 / 1800	43.9	81.4	1012	10	"
18 / 0000	44.6	80.5	1010	10	"
18 / 0600	45.8	79.8	1009	10	"
18 / 1200					absorbed by larger low
04 / 2100	12.1	61.6	1009	30	landfall on Grenada
08 / 0245	19.9	77.6	956	120	landfall near Punta del Ingles, Cuba
08 / 1845	22.1	80.7	941	120	landfall just west of Punta Mangles Altos, Cuba
10 / 1930	30.4	87.1	946	105	landfall on Santa Rosa Island, Florida, 10 miles west of Navarre Beach
10 / 1200	28.5	86.3	930	120	minimum pressure
08 / 1200	20.9	79.5	938	130	maximum wind

Table 2. Selected ship reports with winds of at least 34 kt for Hurricane Dennis, 4 – 13 July 2005.

Date/Time (UTC)	Ship call sign	Latitude (EN)	Longitude (EW)	Wind dir/speed (kt)	Pressure (mb)
07 / 1800	**UBC Stavanger**	15.3	76.8	260 / 43	N/A
07 / 1800	**Lombok Strait**	18.3	74.9	160 / 41	1007.0
08 / 2300	**Caribbean Princess**	24.9	79.8	110 / 56	1008.1
09 / 0000	C6FM9	26.0	79.6	100 / 35	1012.0
09 / 1800	**Sealand Florida**	23.6	82.6	190 / 37	1003.8
09 / 2000	**Julius Hammer**	23.6	82.4	160 / 37	1007.0
09 / 2100	**Sealand Florida**	23.8	81.6	140 / 40	1006.6
10 / 0530	**Explorer of the Seas**	26.3	79.2	120 / 44	1012.5
10 / 0600	**Sea Horse**	25.3	80.0	140 / 35	1019.0
10 / 0600	KS049	25.9	83.3	160 / 39	999.9
10 / 0600	**Carnival Glory**	26.5	78.9	140 / 40	1015.0
10 / 0657	**Explorer of the Seas**	26.0	79.6	100 / 41	1012.0
10 / 1500	KS049	27.6	83.2	190 / 48	1001.8
13 / 2200	**Canadian Enterprise**	42.0	81.5	130 / 40	N/A

Table 3. Selected surface observations for Hurricane Dennis, 4 – 13 July 2005.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Jamaica								
Montego Bay			07/2049	60				
Cuba								
Aguada de Pasajeros	08/2100	977.9	08/2108	96	104			
Bainoa	09/0250	974.5	09/0230	62	67			9.34
Batabanó	09/0455	991.7	09/ N/A	38	48			5.26
Bauta	09/0410	988.9	09/ N/A	35	43			5.55
Cabo Cruz	08/0240	956.0	08/0200	116[h]	129[h]			
Caibarién	08/1800	1000.0	08/1600	31	46			
Camagüey	08/0600	1007.0	08/0500	38	51			
Camilo Cienfuegos	08/1000	1007.1	08/ N/A	36	41			
Casa Blanca	09/0445	975.0	09/0610	68	75			3.64
Cayo Coco	08/0900	1008.3	08/ N/A	30	49			
Cienfuegos	08/1800	982.1	08/1850	81	85			
Colón	08/2110	988.6	08/2110	58	73			10.76
El Jíbaro	08/1400	1002.0	08/1315	56	63			9.27
Esmeralda	08/0700	1005.9	08/0650	35	47			
Florida	08/0900	1005.2	08/0803	38	51			
Guantánamo	07/ N/A	1001.3	07/1850	37	41			
Güines	09/0210	981.1	09/0200	50	57			
Güira de Melena	09/0515	994.2	09/ N/A	29	36			4.23
Indio Hautey	08/2200	994.0	08/2000	62	67			
Jovellanos	08/2200	985.2	08/2350	58	73			12.26
Júcaro	08/1200	1004.5	08/ N/A	45	57			9.57
Jucarito	08/0200	1006.2	08/0440	35	46			
Las Piedra	08/1550	1000.9	08/1543	64	99			15.13
Las Tunas	08/0200	1008.0	08/0950	35	42			
Manzanillo	08/0215	1003.6	08/0135	38	51			
Melena del Sur	09/0230	990.8	09/ N/A	44	56			10.40

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Nuevitas	08/0700	1000.8	08/0600	43	51			
Palo Seco	08/0600	1007.5	08/0600	29	39			
Puerto Padre	08/0000	1008.4	07/1910	35	44			
Sagua la Grande	08/2100	1002.1	08/1700	43	59			
Sancti Spíritus	08/1500	1003.3	08/1750	46	60			9.25
Santa Cruz del Sur	08/0645	999.4	08/0600	71	89			
Santiago de las Vegas	09/0540	989.0	09/0610	68	75			5.54
Santo Domingo	08/1750	1000.9	08/1700	56	63			12.46
Tapaste	09/0230	977.0						11.28
Topes de Collantes			08/1555	81	89			27.67
Trinidad	08/1620	988.6	08/1600	94	103			14.11
Unión de Reyes	09/0000	972.5	08/2350	96	107			11.59
Varadero	09/0000	994.2	08/2330	54	67			6.62
Veguitas	08/0200	1002.8	08/0000	28	41			
Venezuela	08/1200	1005.6	08/ N/A	45	50			
Yabú	08/1800	1001.3	08/1300	31	51			8.06
Florida								
Apalachicola (KAAF)	10/1646	1000.7	11/0420	28	33			2.07
Apalachicola[f,h]	10/1700	1001.5	10/1124	41	56	6.94	8.11	
Big Pine Key			09/1600	34	48			
Brooksville (KBKV)	09/2228	1009.1	10/1652	24	37			1.82
Cache[j]			09/0716		50			
Carysfort Reef Light			09/1500	51	59			
Chekika[f]			09/0337		63			4.08
Crestview (KCEW)	10/2009	989.5	10/2024	37	50			
Clearwater Beach[f]	10/1000	1006.4	09/2100	30	42	3.87	5.15	
Cross City (KCTY)	10.1754	1008.5	09/2318		39			4.32
Destin (KDTS)			10/1929	49	64			
Destin (FCMP tower)	10/1858	986.9	10/1921	55	70			
Eglin AFB A-5	10/1844	983.1	10/1544	73				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Eglin AFB A-13B			10/1934	73	90			
Eglin AFB B-71	10/1958	982.1	10/1906	51	82			
Eglin AFB B-75	10/1940	977.7	10/1958	46	77			
Eglin AFB Valparaiso (KVPS)	10/1923	986.1	10/1923	48	72			
Eglin AFB Yellow River	10/1952	968.5						
Everglades City	09/1201	1007.2	09/1601	22	39			
Flamingo	09/0703	1005.5	09/0703	52	59			
Ft. Lauderdale (KFLL)	09/0841	1010.9	09/0857	26	41			
Ft. Lauderdale (KFXE)	09/0921	1011.2	09/1008	29	39			
Ft. Myers (KFMY)	09/2336	1007.8	09/2000	30	40			4.54
Ft. Myers (KRSW)	09/2336	1007.5	09/1929	29	37			
Ft. Myers[f]	09/2300	1008.7	09/2000		36	2.85	3.20	
Homestead ARB (KHST)	09/0555	1007.5	09/0102	24	38			
Jay[j]			10/1845	62				
Kendall Tamiami (KTMB)	09/0728	1007.5	09/0112	38	56			3.59
Key West (KEYW)	09/0853	1001.9	09/1017	53	64			5.81
Key West[f]	09/0848	1002.3	09/1524	27	44	1.67	2.97	
Marathon (KMTH)	09/0853	1006.5	09/0752	33	47			1.88
McKay Bay[f]			09/1706	28	47	3.38	4.84	
Miami Beach	09/0902	1005.8	09/0202	35	60			1.92
Miami Intl. (KMIA)	09/0622	1009.7	08/2222	36	44			2.39
Naples (KAPF)	09/2210	1005.8	09/1759	33	47			2.95
Naples[f]	09/2300	1009.4	09/0800		38	2.99	4.26	
Navarre (FCMP tower)	10/1909	965.2	10/1921	86	105			
New Pass Mote Lab[g]	10/0000	1005.0	09/1630		40			
Oasis[j]			00/0034		37			
Ochopee[j]			09/1536		37			3.29
Old Port Tampa[f]			09/1712		33	3.20	4.63	
Opa Locka (KOPF)	08/0140	1010.9	09/0315	44	58			2.45
Panama City (KPFN)	10/1707	1001.5	10/1757	33	48			3.46
Panama City Beach[f]	10/1800	994.1	10/1800	51	63	5.72	6.79	

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Pembroke Pines (KHWO)	09/0706	1010.5	09/0753	33	50			3.09
Pensacola (KPNS)	10/1952	956.6	10/2002	66	81			4.11
Pensacola (FCMP tower)	10/1943	956.3	10/1946	71	83			
Pensacola[f]	10/1900	968.7	10/1900	35	51	4.16	5.52	
Pensacola NAS (KNPA)	20/1956	976.6	10/1750	39	50			
Pompano Beach (KPMP)	09/0900	1011.6	09/1025	30	43			1.02
Port Manatee[f]			09/2242	28	41	2.87	4.09	
Punta Gorda (KPGD)	09/2359	1008.5	08/2038	35	44			4.39
St. Marks East[f]			10/2114		37			
St. Marks West[f]			10/1546		44			3.75
St. Petersburg (KPIE)	09/2353	1007.5	09/1044	38	50			2.40
St. Petersburg (KSPG)	09/2350	1007.1	09/1706	37	45			2.45
St. Petersburg[f]			10/1212	31	42	3.15	4.49	
Sarasota (KSRQ)	10/0009	1006.1	09/2057	31	38			1.83
Summerland Key			09/0800	36	50			
Tallahassee (KTLH)	10/2027	1005.4	10/1537	33	44			6.64
Tampa Bay C-CUT[f]	09/2252	1004.1	09/2222	39	48			
Tampa Intl. (KTPA)	09/2354	1008.5	09/1718	27	37			1.73
Tampa MacDill AFB (KMCF)			10/1155	33	43			1.63
Tenraw[f]			09/0723		48			
The Villages (KVVG)			09/2225		41			
Vaca Key[f]	09/0718	1005.8	09/0600		44		1.2	
Vandenburg (KVDF)			09/1757		35			
Virginia Key[f]	09/0700	1009.8	09/0300	31	51	0.6	2.6	
West Palm Beach (KPBI)	09/0709	1012.2	09/1053	27	38			2.04
Winter Haven (KGIF)	09/2226	1009.8	09/2314	26	35			2.40
Alabama								
Covington Cnty[f]			10/2220		43			
Dothan (KDHN)	10/2237	999.2	10/1839	33	44			3.07
Mobile (KMOB)	10/2228	990.5	10/1837	32	42			3.71

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Tuskegee[j]			10/2325		36			
Georgia								
Adel[j]			10/2000		34			
Albany	10/2310	1007.5	10/1853	25	37			4.59
Valdosta	10/2048	1009.8	10/1858	24	34			3.91
Mississippi								
Bienville[j]			11/0505		34			
Biloxi (KBIX)			10/1923	26	40			
Biloxi[f]						2.21	3.36	
Greene[j]			10/2310		34			
Gulfport (KGPT)	10/2254	997.6	10/1952	27	36			0.43
Lauderdale[j]			10.2310		48			
Neshoba[j]			11/0310		41			
Ocean Springs[f]	10/2242	995.9				2.50	2.97	
Pascagoula (KPQL)	10/2325	994.2	10/1931		34			1.06
Wausau[j]			11/0105		37			
Waveland	10/2254	1000.0				1.66	2.11	
Louisiana								
Lake Ponchartrain Mid-lake			10/2210	34	42			
New Orleans Lakefront (KNEW)	11/0030	1003.7	10/2120	31	41			0.08
SW Pass[f]	10/2306	1004.0	10/0636	33	38	1.29	2.54	
Buoys/C-MAN								
NOAA 42003 (26.0N 85.9W)	10/0000	991.5	09/2310	38[e]	49			
NOAA 42007 (30.1N 88.8W)	10/2150	995.1	10/1940	34	45			
COMPS 42013 (27.2N 82.9W)[g]	09/2210	1004.5	10/0210	45				

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
COMPS 42014 (25.3N 82.2W)[g,h]	09/1129	1001.6						
COMPS 42021 (28.3N 83.3W)[g]	10/1100	1005.4						
NOAA 42036 (28.5N 84.5W)[h]	10/1150	996.4	10/0640	46[e]	58			
NOAA 42039 (28.8N 86.0W)[h]	10/1250	979.0	10/1050	47	58			
NOAA 42058 (15.0N 75.0W)	07/0750	1006.9	07/1350	27	35			
USM 42067 (30.0N 88.7W)[i]			10/2140	34	45			
Burrwood, LA (BURL1)	10/2300	1003.7	10/0640	33	39			
Cedar Key, FL (CDRF1)	10/1000	1009.7	10/0050	42[e]	51	4.81	7.79	
Dauphin Island, AL (DPIA1)	10/2100	990.6	10/1740	44[e]	57	2.76	3.51	
Fowey Rocks, FL (FWYF1)	09/0800	1009.7	09/0720	52[e]	73			
Grand Isle, LA (GDIL1)	11/0000	1004.7	10/2120	27	35	1.05	2.01	
Homosassa, FL (HSSF1)[g]	10/0948	1008.8	09/1948	36	52			
Keaton Beach, FL (KTNF1)	10/1500	1008.1	10/1918	34	48			
Long Key, FL (LONF1)	09/0700	1005.7	09/1250	41[e]	54			
Molasses Reef, FL (MLRF1)	09/0700	1007.6	09/0000	45	58			
NW Florida Bay (NFBF1)[g]	09/0724	1006.1	09/0600	41	54		1.2	
Sand Key, FL (SANF1)	09/0900	999.4	09/0920	54[e]	68			
Shell Point, FL (SHPF1)[g]	10/1430	1006.0	10/1700	32	41			
Sombrero Key, FL (SMKF1)	09/0800	1005.5	09/0800	64	76	1.3	2.6	
Tyndall Tower, FL (SGOF1)	10/1400	1000.4	10/1440	55[e]	68			
Venice, FL (VENF1)	10/0000	1006.0	10/1500	36	41			
Unofficial Observations								
Florida								
Boca Grande[k]	09/2300	1006.3	09/2225		34			
Cape Coral[k]	09/2340	1006.3	09/1924		40			
Cudjoe Key			09/0756		57			

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Duck Key			09/1045		66			
Largo[k]	09/2330	1007.3	09/2130		40			
New Port Richey[k]	09/2230	1007.3	09/1745		37			
Niceville[k]	10/1750	988.4	10/1919	39	61			
Pace			10/1956		92		3.5	6.90
Pace	10/1910	945.0						
Pensacola			10/1943		69			
Pensacola (WEAR)	10/ N/A	968.5	10/ N/A		46			7.67
Perdido Key			10/1515	30	42			
St. Petersburg[k]	09/2320	1005.0	09/2200		38			
St. Petersburg[k]	09/2315	1007.3	09/2120		35			
St. Petersburg Beach[k]	09/2345	1002.6	09/2231		45			
Southwood (Florida High)	10/2015	1005.6	10/2350	24	34			6.96
Tallahassee (FSU)								6.64
Venice HS[k]	09/2310	1006.0	08/2115		36			
Alabama								
Foley[k]	10/1925	983.6	10/1600		37			
Lillian	10/2127	986.8	10/1829		38			
Loxley			10/1945		43			
Mobile[k]	10/2200	991.4	09/2000		35			
Mobile Bay (USS Alabama)	10/2137	987.8	10/1948		67			

[a] Date/time is for sustained wind when both sustained and gust are listed.
[b] Except as noted, sustained wind averaging periods for C-MAN and land-based ASOS reports are 2 min; buoy averaging periods are 8 min.
[c] Storm surge is water height above normal astronomical tide level.
[d] Storm tide is water height above National Geodetic Vertical Datum (1929 mean sea level).
[e] 10-min average.
[f] National Ocean Service station – sustained winds are 6-min averages.
[g] University of South Florida COMPS station.
[h] Incomplete record – more extreme values may have occurred.
[i] University of Southern Mississippi station.

[j] RAWS station.
[k] Weather Underground station.
[l] Florida Automated Weather Network station.

Table 4. Supplemental storm-total rainfall observations for Hurricane Dennis, 4 – 13 July 2005.

Location	Rainfall (in)		Location	Rainfall (in)
Jamaica			**Florida**	
Amity Hall	14.27		Andytown 2N	4.13
Beckford Kraal	9.61		Big Cypress	4.65
Bois Content	4.44		Coral Springs	3.27
Brandon Hill	13.28		Coral Springs 11W	3.06
Bybrook	7.85		Ft. Lauderdale WP	4.36
Castleton Gardens	12.60		Hillsboro Canal	3.05
Charm Hole	17.02		Hollywood	5.03
Constant Spring	15.51		Lakeland	3.02
Enfield	10.71		Marco Island	3.03
Ft. George Botanical Gardens	12.44		Mariana (MARF1)	3.75
Golden Spring	17.10		Miles City	4.13
Grass Piece	10.26		Miramar 17W	4.66
Hordley Estate	9.85		Monticello (MTCF1)	6.95
Industry	6.60		Moore Haven	3.05
Kingston Norman Manley Aprt.	12.28		Niceville	5.15
Lawrence Tavern	12.78		Oasis Ranger Station	3.05
Long Road	14.56		Ona	3.33
Mavis Bank	24.54		Ortona	4.88
Monn	14.20		Pennsuco	4.30
Moore Town	18.36		Perrine	6.89
Morant Bay	11.75		Plantation	4.49
New Hall	10.09		Quincy (QCYF1)	4.97
New Works	10.18		Racoon Point	4.09
Norbrook	15.03		South Bay	3.25
Norris	15.38		Steinhatchee (SHMF1)	3.75
Plantain Garden	9.96		Sweetwater 14N	4.07
Ramble	13.92			
Ritchies	13.94		**Georgia**	
Rock River	12.16		Ashburn (ASHG1)	4.70
Rose Hill	18.13		Bainbridge (BAIG1)	5.79
Shirley Castle	23.27		Camilla (CAMG1)	4.37
Spring Garden	8.02		Crisp Cnty Power Dam (WWCG1)	5.86
Swanson	12.14		Dawson (DAWG1)	5.78
Swift River	12.24		Leesburg (LEEG1)	6.14
Thompson Town	11.46		Moultrie (MOUG1)	6.00
Trout Hall	10.00		Tifton (TFTG1)	4.52
Wakefield	7.60			
Worthy Park Estate	7.87		**Alabama**	
			Bay Minette	4.65
			Brewton	3.50
			Camden 10 NW	12.80
			Evergreen	3.81
			Geneva (GVAA1)	3.48
			Jackson	4.24

Table 5. Preliminary forecast evaluation (heterogeneous sample) for Hurricane Dennis, 4 – 13 July 2005. Forecast errors (n mi) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in bold-face type. Verification includes the depression stage, but does not include the extratropical stage, if any.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	32 (27)	62 (27)	96 (27)	135 (27)	192 (23)	266 (19)	354 (15)
GFDI	36 (26)	64 (26)	84 (26)	100 (26)	113 (22)	122 (18)	162 (14)
GFDL*	34 (26)	69 (26)	87 (26)	103 (26)	118 (23)	109 (19)	**152** (15)
GFNI	31 (21)	58 (21)	79 (21)	102 (21)	152 (18)	217 (14)	253 (10)
GFDN*	27 (18)	60 (17)	81 (17)	95 (16)	140 (13)	231 (11)	289 (6)
FV4	53 (25)	89 (25)	112 (24)	113 (24)	89 (21)	121 (17)	230 (13)
AFII	31 (21)	64 (21)	97 (21)	140 (21)	254 (17)		
AFWI*	36 (11)	60 (11)	83 (11)	118 (11)	195 (9)		
COAI	**23** (13)	45 (13)	75 (13)	106 (13)	213 (9)		
COAL*	32 (8)	50 (8)	83 (8)	104 (7)	193 (5)		
COEI	39 (20)	75 (20)	107 (20)	129 (18)			
COCE*	29 (10)	64 (10)	106 (10)	121 (9)			
ETAI	43 (23)	89 (23)	125 (23)	148 (22)	201 (17)		
ETA*	37 (25)	82 (25)	118 (25)	142 (23)	198 (18)		
GFSI	31 (25)	46 (25)	57 (25)	64 (25)	77 (21)	132 (17)	229 (13)
GFSO*	38 (25)	56 (25)	63 (25)	71 (25)	73 (22)	105 (18)	179 (14)
AEMI	33 (19)	54 (18)	68 (18)	76 (18)	92 (15)	104 (12)	**113** (9)
AEMN*	35 (22)	53 (21)	68 (20)	76 (19)	89 (16)	91 (13)	**102** (10)
NGPI	**21** (23)	42 (23)	61 (23)	82 (23)	101 (19)	122 (15)	**136** (11)
NGPS*	25 (25)	44 (24)	66 (24)	84 (23)	107 (19)	134 (15)	**134** (11)
UKMI	25 (25)	38 (25)	52 (25)	68 (25)	98 (21)	179 (17)	288 (13)
UKM*	26 (14)	36 (14)	**50** (14)	63 (13)	98 (11)	141 (9)	250 (7)
A98E	30 (27)	53 (27)	72 (27)	84 (27)	121 (23)	174 (19)	255 (15)
A9UK	26 (12)	44 (12)	56 (12)	62 (12)	87 (10)		
BAMD	26 (27)	40 (27)	56 (27)	74 (27)	106 (23)	175 (19)	278 (15)
BAMM	27 (27)	45 (27)	65 (27)	82 (27)	114 (23)	156 (19)	235 (15)
BAMS	39 (26)	63 (26)	84 (26)	101 (26)	136 (22)	190 (18)	275 (14)
LBAR	29 (27)	45 (27)	68 (27)	90 (27)	137 (23)	143 (19)	210 (15)
CONU	**23** (25)	41 (25)	55 (25)	70 (25)	84 (21)	124 (17)	173 (13)
GUNS	**22** (23)	40 (23)	56 (23)	70 (23)	82 (19)	114 (15)	**147** (11)
GUNA	**22** (23)	41 (23)	53 (23)	65 (23)	75 (19)	106 (15)	155 (11)
FSSE	**23** (22)	40 (22)	**48** (22)	62 (21)	78 (16)	148 (14)	273 (9)
OHPC	31 (25)	46 (25)	58 (25)	70 (25)	77 (21)	125 (17)	224 (13)
OFCI	26 (25)	39 (25)	54 (25)	62 (25)	68 (21)	90 (17)	192 (13)
OFCL	25 (26)	36 (26)	51 (26)	61 (26)	65 (22)	74 (18)	154 (14)
NHC Official (1995-2004 mean)	42 (3400)	75 (3116)	107 (2848)	138 (2575)	202 (2117)	236 (649)	310 (535)

* Output from these models was unavailable at forecast time.

Table 6. Watch and warning summary for Hurricane Dennis, 4 – 13 July 2005.

Date/Time (UTC)	Action	Location
5 / 1500	Tropical Storm Watch issued	Barahona Dominican Republic to Port au Prince Haiti
5 / 2100	Tropical Storm Warning issued	Barahona Dominican Republic to Port au Prince Haiti
5 / 2100	Hurricane Watch issued	Jamaica and the southwest peninsula of Haiti west of the Dominican Republic border
6 / 0300	Hurricane Watch issued	Cayman Is.
6 / 0600	Hurricane Watch issued	Eastern Cuba including Las Tunas, Granma, Santiego de Cuba, Guantanamo, and Holguin
6 / 0900	Hurricane Warning issued	Jamaica and the southwest peninsula of Haiti west of the Dominican Republic border
6 / 0900	Tropical Storm Warning issued	South coast of the Dominican Republic from Barahona westward to the Haiti border
6 / 1500	Hurricane Watch issued	Cuba including Sancti Spiritus, Ciego de Avila, and Camaguey
6 / 2100	Hurricane Warning issued	Eastern Cuba including Granma, Santiago de Cuba, and Guantanamo
7 / 0000	Tropical Storm Warning discontinued	Dominican Republic
7 / 0300	Hurricane Warning issued	Cayman Is.
7 / 1500	Tropical Storm Watch issued	Florida west coast from Bonita Beach southward and Florida east coast from Golden Beach to Ocean Reef
7 / 1500	Hurricane Warning issued	Cuba including Matanzas, Villa Clara, Cienfuegos, Sancti Spiritus, Camaguey, and Las Tunas
7 / 1500	Hurricane Watch issued	Cuba including Isle of Youth, Pinar del Rio, La Habana, Ciudad de la Habana, and Holguin
7 / 1500	Hurricane Watch issued	Florida Keys and Florida Bay
7 / 2100	Tropical Storm Warning issued	Florida Keys east of Seven Mile Bridge to Ocean Reef including Florida Bay
7 / 2100	Hurricane Warning issued	Florida Keys from Seven Mile Bridge westward

Date/Time (UTC)	Action	Location
8 / 0300	Tropical Storm Warning issued	Florida west coast from Bonita Beach southward and Florida east coast from Golden Beach to Ocean Reef
8 / 0300	Tropical Storm Watch issued	Florida west coast north of Bonita Beach to Longboat Key
8 / 0300	Hurricane Warning issued	Cuba including La Habana and Ciudad de la Habana
8 / 0300	Hurricane Warning discontinued	Southwest peninsula of Haiti
8 / 0900	Hurricane Warning discontinued	Jamaica
8 / 1200	Hurricane Warning changed to Tropical Storm Warning	Cayman Brac and Little Cayman
8 / 1200	All warnings discontinued	Grand Cayman Is.
8 / 1500	Tropical Storm Warning discontinued	Cayman Brac and Little Cayman
8 / 2100	Tropical Storm Watch discontinued	Long Boat Key to Bonita Beach
8 / 2100	Tropical Storm Warning issued	Florida west coast from Anclote Key to Longboat Key
8 / 2100	Tropical Storm Watch issued	Florida west coast north of Anclote Key to the Steinhatchee River
8 / 2100	Hurricane Watch issued	Steinhatchee River, Florida to the mouth of the Pearl River
9 / 0300	Tropical Storm Watch issued	Mouth of the Pearl River to Grand Isle, Louisiana including metropolitan New Orleans and Lake Ponchartrain
9 / 0900	Hurricane Warning issued	Steinhatchee River, Florida to the mouth of the Pearl River
9 / 0900	Tropical Storm Warning issued	Mouth of the Pearl River to Grand Isle, Louisiana including metropolitan New Orleans and Lake Ponchartrain
9 / 0900	Tropical Storm Warning issued	Florida west coast north of Anclote Key to the Steinhatchee River
9 / 0900	Hurricane Warning discontinued	Cuba including all provinces from Sancti Spiritus eastward
9 / 1500	Hurricane Watch discontinued	Florida Keys east of Seven Mile Bridge to Ocean Reef
9 / 1500	All watches and warnings discontinued	Cuba
9 / 2100	Hurricane Warning changed to Tropical Storm Warning	Florida Keys west of the Seven Mile Bridge

Date/Time (UTC)	Action	Location
9 / 2100	Tropical Storm Warning discontinued	Florida coast from Golden Beach to Flamingo and the Florida Keys from the Seven Mile Bridge eastward
10 / 0300	Tropical Storm Warning discontinued	Florida west coast south of Bonita Beach
10 / 0900	Tropical Storm Warning issued	Louisiana coast west of Grand Isle to Morgan City
10 / 0900	Tropical Storm Warning discontinued	Florida Keys
10 / 1300	Hurricane Warning changed to Tropical Storm Warning	Florida coast east of the Ochlockonee River to the Steinhatchee River
10 / 1500	Tropical Storm Warning discontinued	West of Grand Isle, Louisiana and south of Longboat Key, Florida
10 / 2100	Hurricane Warning modified to	AL/MS border to Destin, Florida
10 / 2100	Tropical Storm Warning modified to	Destin to Longboat Key, Florida
10 / 2100	Tropical Storm Warning modified to	Mouth of the Pearl River to AL/MS border
10 / 2300	Hurricane Warning changed to Tropical Storm Warning	AL/MS border to Destin, Florida
11 / 0300	All warnings discontinued	U. S. Gulf coast

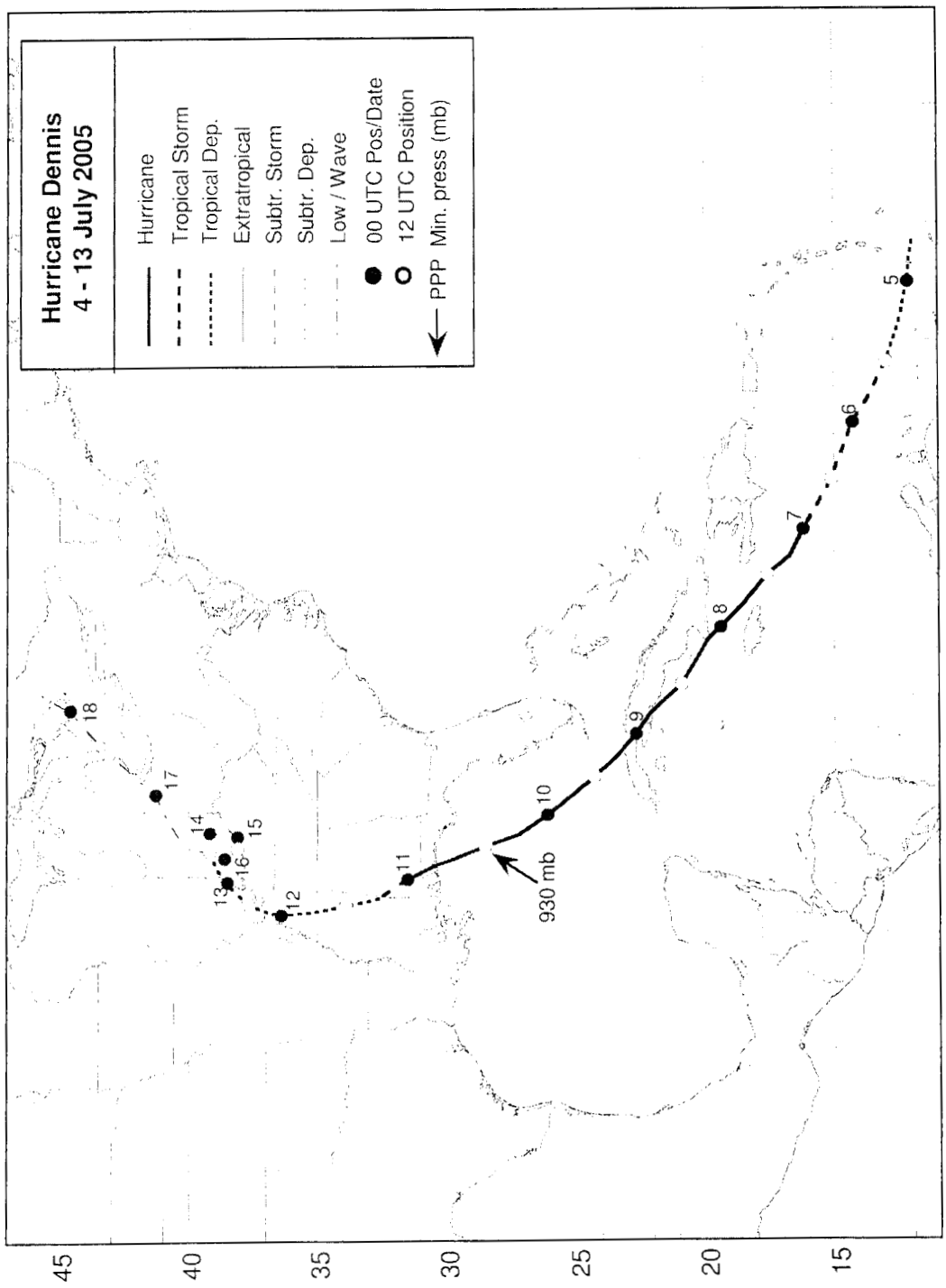


Figure 1. Best track positions for Hurricane Dennis, 4-13 July 2005.

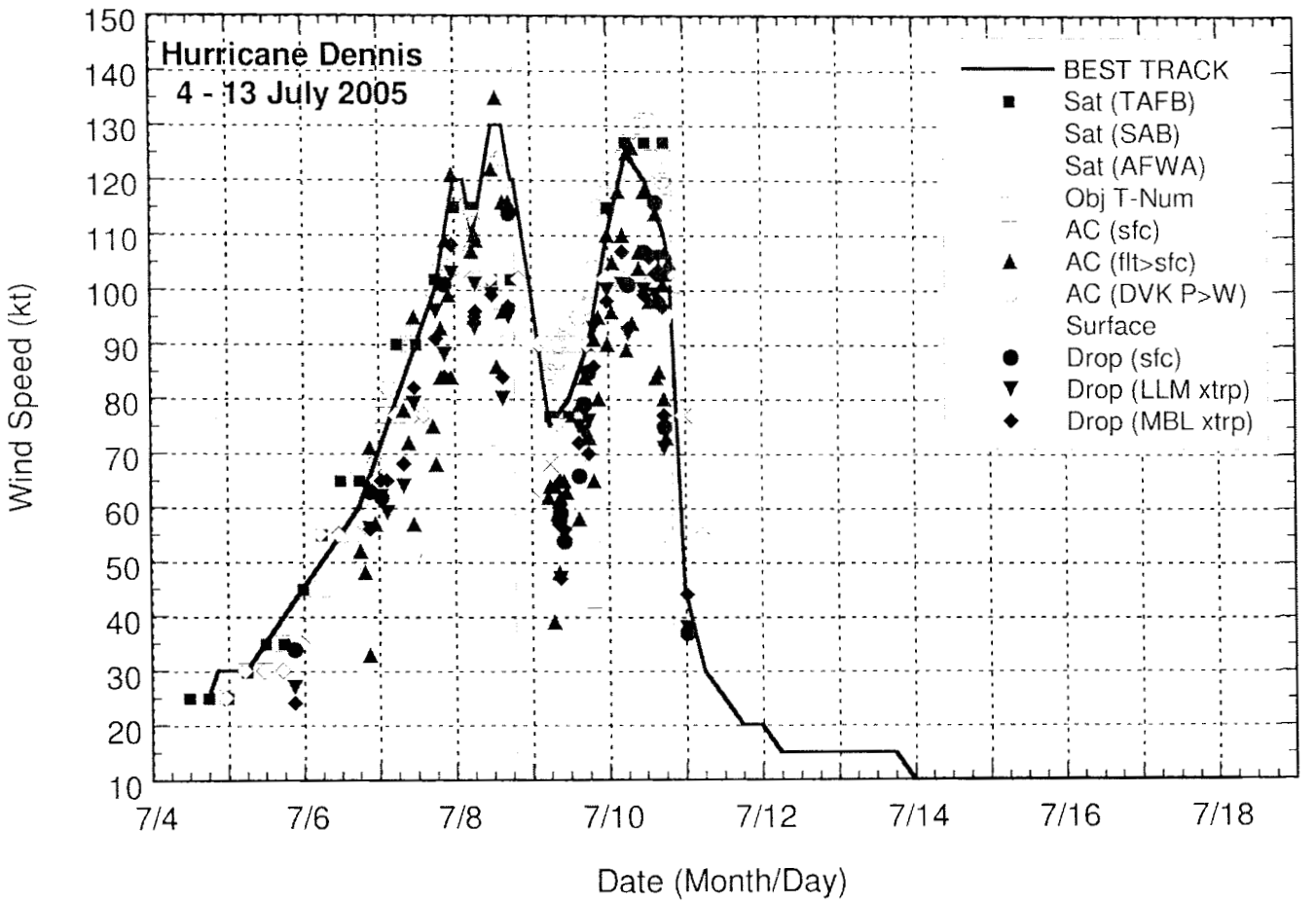


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Dennis, 4-13 July 2005. Aircraft observations have been adjusted for elevation using 90% and 80% reduction factors for observations from 700 mb and 850 mb, respectively. Dropwindsonde observations include actual 10 m winds (sfc), as well as surface estimates derived from the mean wind over the lowest 150 m of the wind sounding (LLM), and from the sounding boundary layer mean (MBL). Objective Dvorak estimates represent linear averages over a three-hour period centered on the nominal observation time. Solid vertical lines indicate times of landfall.

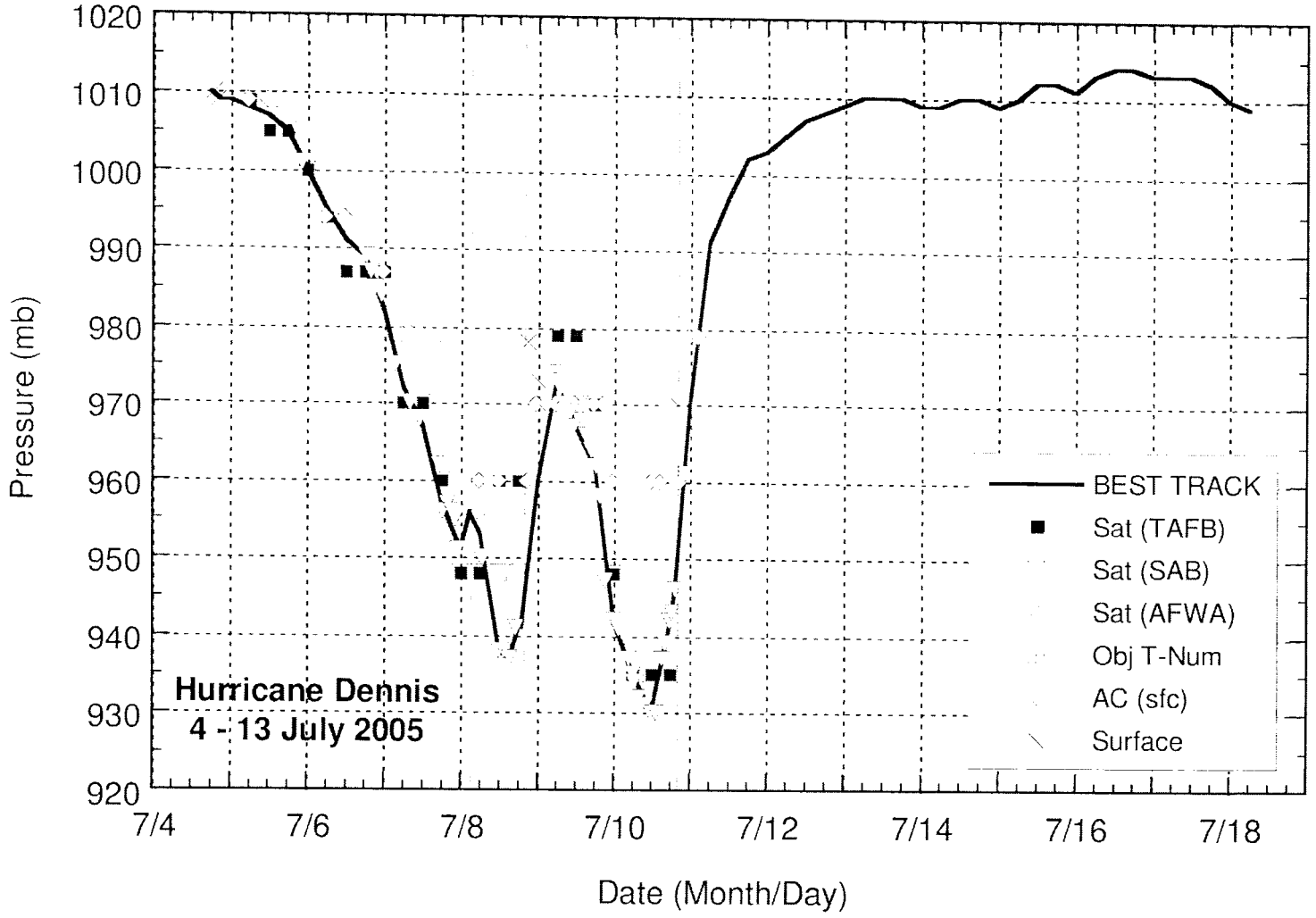


Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Dennis, 4-13 July 2005. Objective Dvorak estimates represent linear averages over a three-hour period centered on the nominal observation time. Solid vertical lines indicate times of landfall.

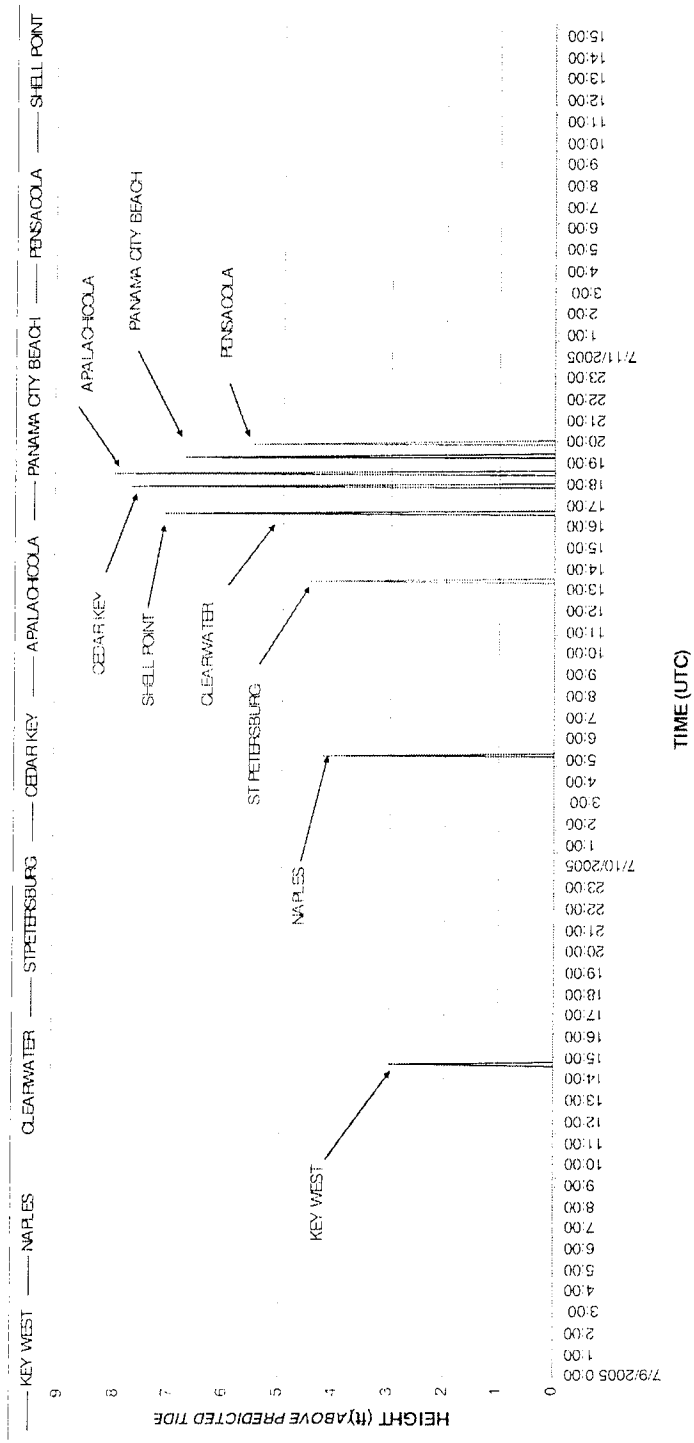


Figure 4. Storm-induced tides (surges) for Hurricane Dennis plotted versus time for the stations along the Florida west coast and Apalachee Bay. Image courtesy of the TPC Storm Surge unit.

Comparative Customer Outage Information,
Panama City Beach and Pensacola,
Hurricane Dennis (2005)

Factor/Variable	Panama City Beach	Pensacola
OH lines (miles)	73.67	310.35
OH percent	54.67	78.67
UG lines (miles)	61.08	84.17
UG percent	45.33	21.33
Total lines (miles)	134.75	394.51
Total customers	30,848	46,222
Hurricane Dennis-Customers out of service, by day:		
Peak	4,363	44,375
Day 1	3,882	43,234
Day 2	1,843	42,003
Day 3	30	27,334
Day 4	14	16,103
Day 5	11	6,773
Hurricane Dennis-Customers out of service per line-mile, by day:		
Peak	32.4	112.5
Day 1	28.8	109.6
Day 2	13.7	106.5
Day 3	0.2	69.3
Day 4	0.1	40.8
Day 5	0.1	17.2

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI EXHIBIT 36
COMPANY PCB (Direct)
WITNESS Peter J. Rant (PJR-3)
DATE 10\02\03\07

7. For each of the 3 Municipalities, please provide the total miles of overhead and underground lines by voltage class and size of conductor.

ANSWER:

Municipality	Type	Miles	Design Voltage	Conductor Size 1	Conductor Size 2	Conductor Size 3
Fort Walton Beach	Overhead	0.307		1/0		
Fort Walton Beach	Overhead	0.003		2		
Fort Walton Beach	Overhead	4.684	12.47			
Fort Walton Beach	Overhead	12.065	12.47	1/0		
Fort Walton Beach	Overhead	31.508	12.47	2		
Fort Walton Beach	Overhead	0.061	12.47	2	3	
Fort Walton Beach	Overhead	0.380	12.47	2	6	
Fort Walton Beach	Overhead	1.495	12.47	3		
Fort Walton Beach	Overhead	1.186	12.47	336		
Fort Walton Beach	Overhead	6.461	12.47	4		
Fort Walton Beach	Overhead	0.283	12.47	4/0		
Fort Walton Beach	Overhead	14.313	12.47	477		
Fort Walton Beach	Overhead	33.673	12.47	6		
Fort Walton Beach	Overhead	0.076	12.47	6	2	
Fort Walton Beach	Overhead	7.199	12.47	795		
Fort Walton Beach	Underground	0.564		1/0		
Fort Walton Beach	Underground	1.733	12.47			
Fort Walton Beach	Underground	2.426	12.47	1/0		
Fort Walton Beach	Underground	7.130	12.47	2		
Fort Walton Beach	Underground	0.260	12.47	6		
Fort Walton Beach	Underground	0.245	12.47	795		
Panama City Beach	Overhead	0.050		1/0		
Panama City Beach	Overhead	0.022		2		
Panama City Beach	Overhead	0.258		3		
Panama City Beach	Overhead	0.040		6		
Panama City Beach	Overhead	2.547	12.47			
Panama City Beach	Overhead	5.685	12.47	1/0		

Municipality	Type	Miles	Design Voltage	Conductor Size 1	Conductor Size 2	Conductor Size 3
Panama City Beach	Overhead	4.904	12.47	2		
Panama City Beach	Overhead	0.343	12.47	250		
Panama City Beach	Overhead	19.944	12.47	3		
Panama City Beach	Overhead	0.019	12.47	350		
Panama City Beach	Overhead	0.316	12.47	4		
Panama City Beach	Overhead	6.146	12.47	4/0		
Panama City Beach	Overhead	5.312	12.47	477		
Panama City Beach	Overhead	15.774	12.47	6		
Panama City Beach	Overhead	12.153	12.47	795		
Panama City Beach	Overhead	0.024	7.2	1/0		
Panama City Beach	Overhead	0.086	7.2	2		
Panama City Beach	Overhead	0.044	7.2	3		
Panama City Beach	Underground	0.136				
Panama City Beach	Underground	3.036		1/0		
Panama City Beach	Underground	0.183		1000		
Panama City Beach	Underground	26.071	12.47			
Panama City Beach	Underground	25.669	12.47	1/0		
Panama City Beach	Underground	0.919	12.47	1000		
Panama City Beach	Underground	3.783	12.47	2		
Panama City Beach	Underground	0.321	12.47	3		
Panama City Beach	Underground	0.020	12.47	6		
Panama City Beach	Underground	0.059	12.47	795		

Municipality	Type	Miles	Design Voltage	Conductor Size 1	Conductor Size 2	Conductor Size 3
Panama City Beach	Underground	0.887	7.2	1/0		
Panama City Beach	Underground	0.136				
Panama City Beach	Underground	3.036		1/0		
Panama City Beach	Underground	0.183		1000		
Panama City Beach	Underground	26.071	12.47			
Panama City Beach	Underground	25.669	12.47	1/0		
Panama City Beach	Underground	0.919	12.47	1000		
Panama City Beach	Underground	3.783	12.47	2		
Panama City Beach	Underground	0.321	12.47	3		
Panama City Beach	Underground	0.020	12.47	6		
Panama City Beach	Underground	0.059	12.47	795		
Panama City Beach	Underground	0.887	7.2	1/0		
Pensacola	Overhead	0.037				
Pensacola	Overhead	1.318		1/0		
Pensacola	Overhead	0.076		2		
Pensacola	Overhead	101.035	12.47			
Pensacola	Overhead	0.041	12.47	1		
Pensacola	Overhead	28.624	12.47	1/0		
Pensacola	Overhead	0.014	12.47	1/0	6	
Pensacola	Overhead	0.262	12.47	1000		
Pensacola	Overhead	16.808	12.47	2		
Pensacola	Overhead	1.501	12.47	2/0		
Pensacola	Overhead	10.126	12.47	250		
Pensacola	Overhead	2.054	12.47	3		
Pensacola	Overhead	3.645	12.47	336		
Pensacola	Overhead	4.608	12.47	4		
Pensacola	Overhead	12.016	12.47	4/0		
Pensacola	Overhead	64.432	12.47	477		
Pensacola	Overhead	33.622	12.47	6		
Pensacola	Overhead	0.309	12.47	6		

Municipality	Type	Miles	Design Voltage	Conductor Size 1	Conductor Size 2	Conductor Size 3
Pensacola	Overhead	16.206	12.47	795		
Pensacola	Overhead	7.759	4.16			
Pensacola	Overhead	2.858	4.16	1/0		
Pensacola	Overhead	0.149	4.16	2		
Pensacola	Overhead	0.044	4.16	3		
Pensacola	Overhead	1.005	4.16	4/0		
Pensacola	Overhead	1.798	4.16	6		
Pensacola	Underground	0.019				
Pensacola	Underground	2.251		1/0		
Pensacola	Underground	46.004	12.47			
Pensacola	Underground	0.032	12.47	1		
Pensacola	Underground	17.328	12.47	1/0		
Pensacola	Underground	3.621	12.47	1000		
Pensacola	Underground	12.946	12.47	2		
Pensacola	Underground	1.361	12.47	350		
Pensacola	Underground	0.055	12.47	4/0		
Pensacola	Underground	0.071	12.47	477		
Pensacola	Underground	0.116	12.47	6		
Pensacola	Underground	0.189	12.47	750		
Pensacola	Underground	0.117	12.47	795		
Pensacola	Underground	0.057	4.16			

17. For each of the 3 Municipalities, please provide the following outage data, including:

a. Summary tables for annual outages for each year of the most recent 10-year period, which include data showing:

(1) cause of outages;
(2) number of customers without power;
(3) length of outages; and
(4) cost to restore power.

b. For major storms (named tropical storms and hurricanes), please provide by storm for the most recent 10 years:

(1) name of storm;
(2) number of customers without power;
(3) length of outage, including a distribution of the number of customers experiencing outages for 1 day, 2 days, 3 days, and so on until 100 percent of customers were capable of receiving service from Gulf's facilities; and
(4) cost to restore power.

ANSWER:

See attached pages.

a.

1999 – Pensacola		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	12,255	61.45
Lightning	8,166	148.85
Deterioration	8,702	103.59
Tree	6,475	115.92
Other	10,213	55.02
Equipment Failure	76	163.55
Vehicle	128	119.75
Overload	2,121	91.44
Wind/Rain	301	124.57
Dig-In	3,169	105.67
Vandalism	124	113.89
All Others	337	78.00
Total	52,067	96.74

1999 – Fort Walton		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	3,418	51.66
Deterioration	1,293	87.63
Lightning	1,531	108.49
Other	2,187	54.41
Tree	276	72.73
Equipment Failure	236	148.27
Vehicle	2,008	103.40
Overload	559	81.38
Dig-In	1,402	182.80
Vandalism	1,653	57.30
All Others	2,149	84.42
Total	16,712	73.78

1999 – Panama City Beach		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Lightning	13,997	135.44
Deterioration	4,874	110.50
Animal	382	77.44
Equipment Failure	82	225.00
Overload	776	103.40
Vehicle	275	155.46
Other	334	68.73
Tree	58	76.71
Dig-In	69	146.80
Wind/Rain	57	110.67
Contamination/Corrosion	1,065	43.00
All Others	192	88.00
Total	22,161	123.52

2000 – Pensacola		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	14,997	61.81
Lightning	10,752	120.55
Deterioration	4,090	122.03
Tree	11,814	105.84
Unknown	1,846	97.78
Overload	1,589	84.18
Vehicle	1,096	134.38
Other	3,490	63.38
Wind/Rain	1,037	138.90
None	2,279	125.58
All Others	2,646	93.71
Total	55,636	93.46

2000 – Fort Walton		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	3,902	54.85
Lightning	7,769	143.76
Deterioration	3,004	126.96
Unknown	2,493	74.02
Tree	1,092	105.56
Other	1,521	81.53
Vehicle	4,622	107.80
Overload	1,030	70.69
Contamination/Corrosion	93	111.40
Dig-In	2,449	78.00
Wind/Rain	335	90.00
All Others	2,774	61.68
Total	31,084	87.22

2000 – Panama City Beach		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Deterioration	1,695	132.77
Lightning	1,868	136.45
Animal	155	87.42
Overload	872	150.43
Unknown	534	137.89
Vehicle	2,939	168.59
Tree	3,672	103.08
Wind/Rain	1,174	124.85
Other	1,919	75.82
Contamination/Corrosion	64	188.50
All Others	2,928	144.24
Total	17,820	131.53

2001 – Pensacola		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	8,044	71.01
Tree	19,507	108.65
Deterioration	3,095	132.43
Lightning	8,300	132.24
Unknown	7,732	79.56
Vehicle	1,592	228.77
Wind/Rain	381	119.13
Vines	41	66.64
Overload	40	87.07
Other	3,856	72.86
All Others	305	116.39
Total	52,893	98.64

2001 – Fort Walton		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	5,541	58.65
Deterioration	2,294	99.56
Lightning	2,684	102.43
Unknown	5,895	70.79
Tree	357	85.06
Vehicle	711	95.90
Other	116	66.22
Wind/Rain	203	154.14
Overload	137	63.86
Dig-In	387	165.33
Contamination/Corrosion	105	90.00
All Others	13	124.90
Total	18,443	76.76

2001 – Panama City Beach		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Lightning	1,649	131.30
Deterioration	1,454	134.89
Animal	341	57.20
Unknown	1,092	86.55
Vehicle	1,197	168.29
Tree	560	126.67
Overload	802	90.92
Dig-In	116	122.33
None	6	57.50
Improper Installation	21	104.25
All Others	167	127.25
Total	7,405	117.36

2002 – Pensacola		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	7,357	68.00
Deterioration	8,426	132.06
Lightning	6,901	177.77
Tree	9,280	121.61
Unknown	6,690	109.09
Vehicle	2,855	124.64
Overload	770	106.73
Vines	144	85.30
Other	158	100.50
Wind/Rain	112	92.43
All Others	365	116.59
Total	43,058	105.49

2002 – Fort Walton		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	5,321	55.90
Deterioration	3,257	125.18
Lightning	9,514	92.62
Unknown	4,720	85.37
Tree	471	101.84
Vehicle	1,492	138.96
Overload	3,298	112.00
Dig-In	57	227.57
Other	201	85.00
Vines	26	59.20
Contamination/Corrosion	16	126.00
All Others	197	73.28
Total	28,570	81.38

2002 – Panama City Beach		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Deterioration	8,371	139.99
Unknown	2,033	123.86
Lightning	2,250	103.24
Animal	748	71.88
Tree	763	120.60
Overload	813	138.74
Other	3,396	89.62
Dig-In	163	249.36
Vehicle	1,858	126.55
Wind/Rain	101	125.60
All Others	4,634	97.30
Total	25,130	22.72

2003 – Pensacola		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	4,369	64.85
Unknown	3,943	101.94
Deterioration	3,968	128.53
Lightning	6,910	140.50
Tree	10,247	102.02
Vehicle	3,628	229.57
Vines	79	102.40
Overload	165	76.14
Wind/Rain	215	99.58
Other	23	103.00
All Others	489	120.87
Total	34,036	102.28

2003 – Fort Walton		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	3,346	58.57
Unknown	5,097	73.25
Deterioration	2,907	107.90
Lightning	5,518	101.86
Tree	698	86.71
Vehicle	3,805	123.32
Vines	77	60.69
Overload	104	69.38
Wind/Rain	493	113.57
Dig-In	36	129.00
Other	1,197	65.00
Improper Installation	11	85.33
Contamination/Corrosion	3	79.00
All Others	20	53.00
Total	23,312	78.86

2003 – Panama City Beach		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Deterioration	2,368	128.19
Lightning	3,514	112.21
Unknown	1,987	95.57
Animal	2,433	78.56
Overload	6,820	110.49
Tree	427	123.29
Vehicle	2,248	100.80
Contamination/Corrosion	18	178.00
Dig-In	975	182.33
Wind/Rain	1,825	79.00
Improper Installation	106	82.00
All Others	921	110.00
Total	23,642	111.26

2004 – Pensacola		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	4,862	76.85
Deterioration	4,860	203.06
Unknown	6,330	176.88
Tree	15,778	132.70
Lightning	8,371	182.96
Vehicle	7,548	192.61
Vines	157	122.33
Wind/Rain	485	116.20
Overload	98	120.11
Other	473	142.72
All Others	237	133.30
Total	49,199	147.48

2004 – Fort Walton		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	2,517	71.43
Deterioration	5,832	144.48
Unknown	3,782	89.93
Lightning	6,139	122.13
Tree	3,569	102.84
Vehicle	1,035	141.33
Wind/Rain	401	115.00
Overload	359	119.64
Other	2,480	95.36
Dig-In	60	123.50
All Others	2,220	93.50
Total	28,394	103.11

2004 – Panama City Beach		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Deterioration	2,017	130.59
Lightning	5,771	164.31
Unknown	6,359	120.81
Animal	342	73.54
Contamination/Corrosion	320	87.14
Vehicle	526	158.16
Overload	706	144.47
Dig-In	112	175.50
Other	33	130.10
Tree	186	118.89
All Others	311	91.90
Total	16,683	128.44

2005 – Pensacola		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Unknown	16,244	164.91
Deterioration	3,450	211.58
Lightning	6,738	274.98
Animal	1,885	101.97
Tree	9,278	147.99
Vehicle	6,812	157.97
Wind/Rain	1,414	145.50
Overload	666	112.96
Contamination/Corrosion	35	166.86
Dig-In	62	404.89
All Others	208	111.96
Total	46,792	180.49

2005 – Fort Walton		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	1,664	75.64
Deterioration	10,546	139.50
Unknown	2,924	111.99
Lightning	7,851	146.53
Tree	1,032	106.80
Vehicle	841	213.41
Wind/Rain	176	112.00
Contamination/Corrosion	164	169.17
Overload	503	140.36
Dig-In	105	173.89
Other	75	103.67
All Others	1,784	101.24
Total	27,665	119.68

2005 – Panama City Beach		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Deterioration	2,587	125.99
Unknown	3,792	109.91
Lightning	4,641	120.58
Animal	994	89.93
Vehicle	701	131.60
Tree	2,916	105.07
Contamination/Corrosion	83	220.07
Dig-In	72	159.92
Wind/Rain	1,278	71.58
Overload	601	113.18
All Others	34	97.71
Total	17,699	119.47

2006 – Pensacola		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Deterioration	6,524	178.86
Lightning	11,260	210.41
Tree	8,003	141.73
Animal	1,693	90.69
Unknown	6,133	122.82
Wind/Rain	7,184	155.48
Vehicle	4,418	144.53
Overload	519	112.64
Vines	75	124.19
Other	2,629	82.24
All Others	1,761	175.59
Total	50,199	158.74

2006 – Fort Walton		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	3,095	79.32
Deterioration	2,939	161.03
Lightning	3,423	134.05
Tree	1,791	109.59
Wind/Rain	5,588	151.65
Unknown	6,854	95.70
Vehicle	1,614	122.91
Contamination/Corrosion	95	90.17
Dig-In	244	241.89
Other	162	105.23
All Others	375	92.53
Total	26,180	122.52

2006 – Panama City Beach		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Deterioration	3,589	140.35
Lightning	5,531	111.24
Unknown	2,272	112.88
Animal	2,372	78.20
Wind/Rain	6,453	144.34
Tree	377	99.56
Vehicle	2,932	192.03
Contamination/Corrosion	3,528	107.88
Overload	737	123.35
Other	472	106.88
All Others	2,799	87.67
Total	31,062	120.72

b. No municipality storm data exists prior to Tropical Storm Cindy.

Tropical Storm Cindy Restoration Timeline			
Municipality	**Pensacola**	**Fort Walton**	**Panama City Beach**
Peak	2,364	6	14
7/6/2005	36	3	18
7/7/2005	-	-	-

Hurricane Katrina Restoration Timeline			
Municipality	**Pensacola**	**Fort Walton**	**Panama City Beach**
Peak	34,517	5,182	692
8/29/2005	34,013	4,991	281
8/30/2005	10,744	3,438	95
8/31/2005	1,176	64	-
9/1/2005	281	17	136

Hurricane Dennis Restoration Timeline			
Municipality	**Pensacola**	**Fort Walton**	**Panama City Beach**
Peak	44,375	23,487	4,363
7/10/2005	43,234	19,643	3,882
7/11/2005	42,003	16,570	1,843
7/12/2005	27,334	17,813	30
7/13/2005	16,103	7,842	14
7/14/2005	6,773	318	11
7/15/2005	350	74	-
7/16/2005	57	27	68

21. For each of the 3 Municipalities, what is the total number of customers (meters) in each local area?

ANSWER:

Customers (Meters) per Municipality	
Municipality	**Customers**
Fort Walton	32,614
Panama City Beach	30,848
Pensacola	46,222

35. For each of the 3 Municipalities, please provide SAIDI, SAIFI, CAIDI, and MAIFI indices for the past 5 years.

ANSWER:

2002				
Municipality	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
Fort Walton	71.31	0.88	81.40	Not available per municipality
Panama City Beach	66.60	0.81	81.75	
Pensacola	84.09	0.93	90.27	

2003				
Municipality	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
Fort Walton	51.58	0.71	72.16	Not available per municipality
Panama City Beach	68.70	0.77	89.65	
Pensacola	67.15	0.74	91.19	

2004				
Municipality	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
Fort Walton	76.15	0.87	87.46	Not available per municipality
Panama City Beach	65.85	0.54	121.76	
Pensacola	136.00	1.06	127.77	

2005				
Municipality	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
Fort Walton	88.45	0.85	104.27	Not available per municipality
Panama City Beach	54.41	0.57	94.83	
Pensacola	112.74	1.01	111.37	

2006				
Municipality	**SAIDI**	**SAIFI**	**CAIDI**	**MAIFI**
Fort Walton	99.10	0.80	123.46	Not available per municipality
Panama City Beach	118.01	1.01	117.20	
Pensacola	142.60	1.09	131.30	

Power Services

Management Services For Utilities®

R. L. WILLOUGHBY
VICE PRESIDENT

PROFESSIONAL EDUCATION:

CENTRAL MICHIGAN UNIVERSITY, Mt. Pleasant, MI
MSA - Masters of Science Administration, 1992

MT. OLIVE COLLEGE, Mt. Olive, NC
BS - Business Management, 1988

LENOIR COMMUNITY COLLEGE, Kinston, NC
A.A.S. - Industrial Management, 1987

EXPERIENCE:

Mr. Willoughby has 40 years experience with operations, maintenance, and management of utility systems. He has worked with all aspects of utility operations and management, including 8 years as an electric utility director, and 7 years as a city manager.

From January 2000 through December 2005, Mr. Willoughby has served on the Board of Directors for two nationally recognized Joint Municipal Power Agencies, and one Joint Municipal Assistance Agency. The combined annual budget for the three agencies was over $1 billion dollars. The two Joint Municipal Power Agencies have 51 members with a combined annual demand of 2300 megawatts, and the Joint Municipal Assistance Agency has 90 members in three states.

2005 - Present

Vice President
POWERSERVICES, INC.
Wake Forest, North Carolina

Assisting utilities in management and planning to achieve optimum reliability and cost management for power systems, including long-range planning, economic analyses, privatization studies, coordination studies, rate issues and studies, system improvement studies, and power supply contracts and negotiations.

Also provides assistance to president with accident investigation, fire investigation, forensic engineering, and product evaluation in expert witness services.

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI **EXHIBIT** 37
COMPANY PCB (Direct)
WITNESS R. L. Willoughby (RLW-1)
DATE 10/02-03/07

R. L. WILLOUGHBY
(Continued)

2003-2005

Vice President of Management Services
BOOTH & ASSOCIATES, INC., Consulting Engineers
Raleigh, North Carolina

Assisted with implementation, assignation, and focusing direction of System Planning and Power Quality Division company management personnel.

Supervised the System Planning and Power Quality Division to provide planning solutions to fill individual utility client's needs. Assisted in providing Long-Range Plans, Construction Work Plans, creation of system models, Automation Integration Plans, protective coordination, environmental reports, power requirements studies, system upgrades and replacements, and power quality studies.

1996-2003

City Manager
CITY OF WASHINGTON
Washington, North Carolina

Provided leadership and administration of the day to day operations of the city. Worked with the City Council and citizens, to ensure quality services and programs for the citizens and the business community.

City had 225 employees and a $40 million dollar annual budget.

1988-1996

Electric Utility Director
CITY OF WASHINGTON
Washington, North Carolina

Planned, directed, and coordinated all activities of the city's electric utility division. Accomplished directives identified by the City Council and City Manager, coordinated activities of the electric department and between the electric department and other city departments, identified operating, maintenance, and/or construction concerns and initiated appropriate corrective actions, administered annual budget for electric department, participated in load and rate studies, provided oversight for staff technical and safety training programs, and conferred with technical and engineering personnel relative to plans and specifications for construction projects.

R. L. WILLOUGHBY
(Continued)

1985-1988	Electric System Manager **CITY OF KINSTON** Kinston, North Carolina

Provided for the direction of the Utilities Department electrical engineering sections. Included responsibility for all aspects of utility operations, including technical and economic feasibility analysis; operation and maintenance programs; and inspections.

1971-1988	**CITY OF KINSTON** Kinston, North Carolina

Various job responsibilities dealing with the operations and maintenance of the electric distribution system.

PROFESSIONAL AFFILIATIONS: International City/County Managers Association (ICMA)

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO._____ EXHIBIT ~~#38~~ Not Entered
COMPANY _____
WITNESS _____
DATE _____

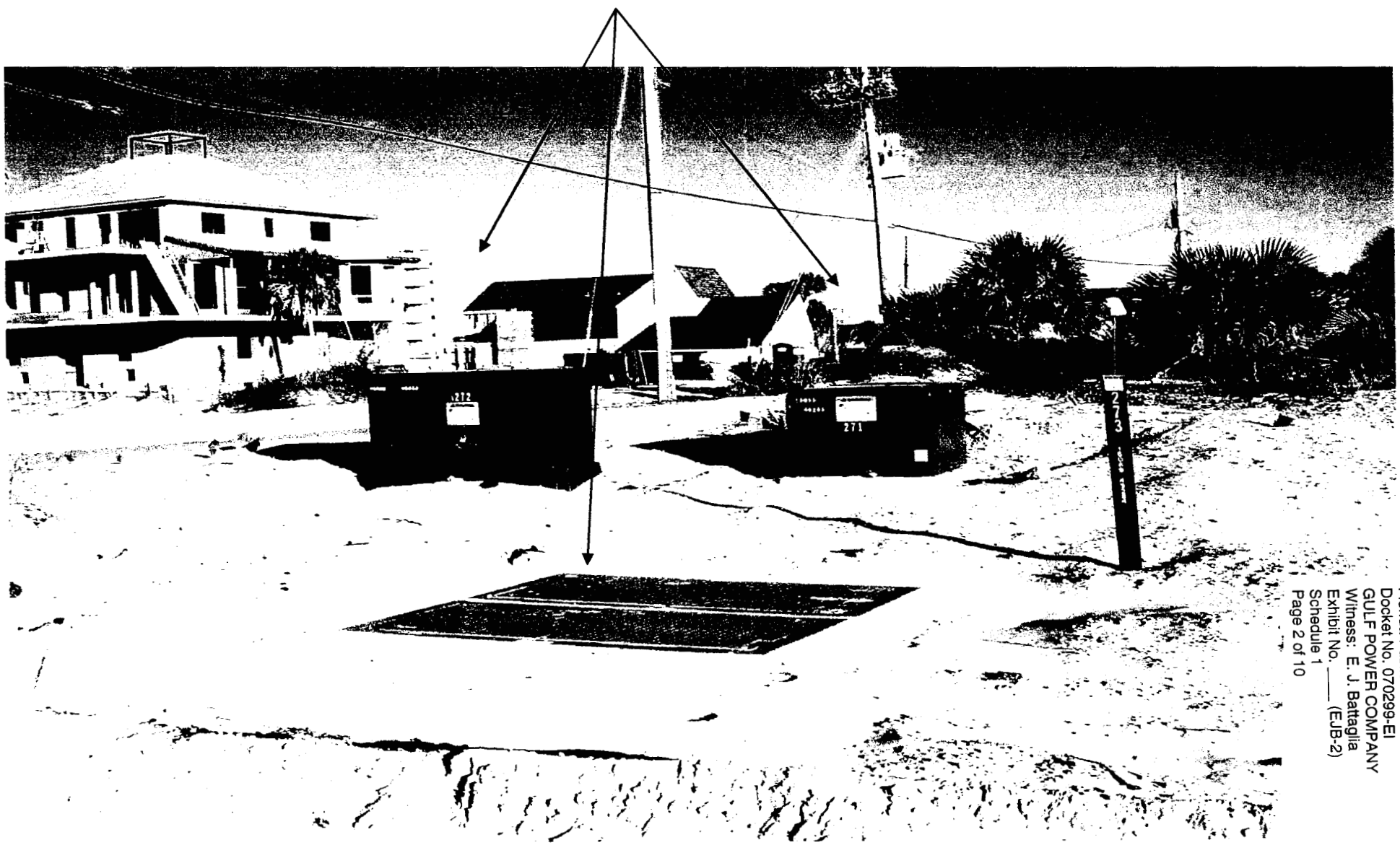
Index	Schedule Number
Pictorial history of storm surge impact on underground facilities	1
Summary chart of utilities	2
National Weather Services Storm Report for Hurricane Fran, 1996	3
National Weather Services Storm Report for Hurricane Bertha, 1996	4
National Weather Services Storm Report for Hurricane Bonnie, 1998	5
National Weather Services Storm Report for Hurricane Dennis, 1999	6
National Weather Services Storm Report for Hurricane Floyd, 1999	7
North Carolina Hurricane Tracks for 1996 to 1999	8
Hurricane Dennis wind field data	9

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI EXHIBIT 39
COMPANY Gulf (Rebuttal)
WITNESS Edward J. Battaglia (EJB-2)
DATE 10/23/07

Underground and Under sand

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: E. J. Battaglia
Exhibit No. _____ (EJB-2)
Schedule 1
Page 1 of 10

PAD MOUNTED EQUIPMENT MAY NOT SURVIVE AS WELL AS FLUSH MOUNTED EQUIPMENT IN STORM SURGE



Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: E. J. Battaglia
Exhibit No. ____ (EJB-2)
Schedule 1
Page 2 of 10

Destroyed Underground Switching Cabinet

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: E. J. Battaglia
Exhibit No. ____ (EJB-2)
Schedule 1
Page 3 of 10

Navarre Underground Cable Crossing

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: E. J. Battaglia
Exhibit No. _____ (EJB-2)
Schedule 1
Page 4 of 10

Underground Cables Exposed by Storm Surge

Road Destroyed on Barrier Island

HURRICANE OPAL 1995

- **There was a cul-de-sac here; now it's a canal. Our equipment is underwater.**

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: E. J. Battaglia
Exhibit No. ____ (EJB-2)
Schedule 1
Page 7 of 10

Customer Debris Hampers Restoration Efforts

Erosion around Padmount Switchgear

Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: E. J. Battaglia
Exhibit No. ____ (EJB-2)
Schedule 2
Page 1 of 1

Utility	Customers	Miles of line	Overhead Miles	Underground Miles
City of Washington	12,000	350	297	53
City of Kinston	12,400	450	N.A.	N.A.
Gulf Power Company	427,000	7,200	5,800	1,400

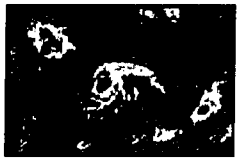
Preliminary Report
Hurricane Fran
23 August - 8 September 1996

Max Mayfield
National Hurricane Center
10 October 1996

PRELIMINARY REPORTS
Tropical Storm Arthur
Hurricane Bertha
Hurricane Cesar
Hurricane Dolly
Hurricane Edouard
Hurricane Fran
Tropical Storm Gustav
Hurricane Hortense
Hurricane Isidore
Tropical Storm Josephine
Tropical Storm Kyle
Hurricane Lili
Hurricane Marco

Fran was a Cape Verde hurricane that moved across the Atlantic during the peak of the hurricane season. It made landfall on the North Carolina coast as a category three hurricane on the Saffir/Simpson Hurricane Scale, resulting in significant storm surge flooding on the North Carolina coast, widespread wind damage over North Carolina and Virginia, and extensive flooding from the Carolinas to Pennsylvania.

a. Synoptic History



Colorized infrared image of Hurricane Fran as part of a triple tropical cyclone outbreak. (98K GIF)

Colorized infrared image of Hurricane Fran near peak intensity east of the northern Bahamas and Florida. (87K GIF)

Hurricane Fran formed from a tropical wave that emerged from the west coast of Africa on 22 August. Deep convection associated with the wave was organized in a banding-type pattern and animation of satellite images suggested a cyclonic circulation. Ship reports soon confirmed that the circulation was on the surface. The post-analysis "best track" in Figure 1 (86K GIF) shows that the system became a tropical depression just southeast of the Cape Verde Islands at 1200 UTC 23 August. Best track position, central pressure and maximum one-minute sustained wind speed are listed for every six hours in Table 1.

The tropical depression moved westward near 15 knots for the next few days without significant development. This lack of development may be attributed, in part, to disrupted low-level inflow due to the large and powerful Hurricane Edouard which was centered about 750 n mi to the west-northwest. Satellite intensity estimates suggest that the depression became Tropical Storm Fran at 1200 UTC 27 August while located about 900 n mi east of the Lesser Antilles.

Fran began to track toward the west-northwest in the wake of Hurricane Edouard. Deep convection became more concentrated and Fran is estimated to have reached hurricane status at 0000 UTC 29 August while centered about 400 n mi east of the Leeward Islands. The center of Fran was about 150 n mi to the northeast of the Leeward Islands near 1200 UTC 30 August.

The tropical cyclone weakened to just below hurricane strength later on the 30th, possibly due to the low-level inflow being disrupted

again by Edouard. About this time, changing steering currents caused Fran to turn toward the northwest and slow to about 5 knots.

By 1200 UTC 31 August, as Edouard moved farther away, Fran had regained hurricane strength. As Hurricane Edouard moved northward off the U.S. mid-Atlantic coast, the subtropical ridge became better established to the north of Fran, causing Fran to resume a west-northwestward motion with an increased forward speed of about 10 knots. Fran moved on a track roughly parallel to the Bahama Islands with the eye remaining a little more than 100 n mi to the northeast of the islands.

Fran strengthened to a category three hurricane by the time it was northeast of the central Bahamas on 4 September. The powerful tropical cyclone began to be influenced by a cyclonic circulation centered over Tennessee that was most pronounced in mid to upper levels of the atmosphere. Fran was steered by the resulting flow around the low over Tennessee and the western extension of the subtropical ridge over the northwest Atlantic. The hurricane gradually turned toward the northwest to north- northwest and increased in forward speed.

The minimum central pressure dropped to 946 mb and maximum sustained surface winds reached 105 knots, Fran's peak intensity, near 0000 UTC 5 September when the hurricane was centered about 250 n mi east of the Florida east coast.

Fran was moving northward near 15 knots when it made landfall on the North Carolina coast. The center moved over the Cape Fear area around 0030 UTC 6 September, but the circulation and radius of maximum winds were large and hurricane force winds likely extended over much of the North Carolina coastal areas of Brunswick, New Hanover, Pender, Onslow and Carteret counties. At landfall, the minimum central pressure is estimated at 954 mb and the maximum sustained surface winds are estimated at 100 knots. The strongest winds likely occurred in streaks within the deep convective areas north and northeast of the center.

Fran weakened to a tropical storm while centered over central North Carolina and subsequently to a tropical depression while moving through Virginia. The tropical cyclone gradually lost its warm core as it moved over the eastern Great Lakes and became extratropical near 0000 UTC 9 September while centered over southern Ontario. The remnants of Fran were absorbed into a frontal system near 0600 UTC 10 September.

b. Meteorological Statistics

Figures 2 (57K GIF) and 3 (78K GIF) show the curves of minimum central sea-level pressure and maximum one-minute "surface" wind speed, respectively, as a function of time. The observations on which the curves are based are also plotted and consist of aircraft reconnaissance data and Dvorak-technique estimates using satellite imagery, as well as synoptic fixes after landfall. According to international agreements within the world meteorological community, the surface wind is actually the wind representative of 33 feet (10 meters) above the ground.

All operational aircraft reconnaissance flights into Fran were provided by the U.S. Air Force Reserves. These "Hurricane Hunters"

made 71 center fixes during 17 flights. The minimum central pressure reported by aircraft was 946 mb at 2306 UTC 4 September. A circular eye with a diameter of 25 n mi was observed on aircraft radar at this time. The 946 mb minimum pressure was measured by dropsonde and was the lowest pressure reported during Fran's existence. The maximum winds of 114 knots from a flight level of 700 mb (near 10,000 feet) were measured about 6 hours prior to the 946 mb pressure report. Flight-level winds in excess of 100 knots were reported several times during the two days prior to landfall. 113-knot winds were reported from aircraft 52 n mi east of the hurricane center at 2314 UTC 5 September, and 107-knot winds were reported 41 n mi northeast of the center at the time of landfall. However, the core of the hurricane weakened somewhat on radar presentations, and a closed eyewall was not reported by aircraft during the two hours prior to the center moving onshore.

Objective intensity estimates from digital infrared satellite imagery peaked near the time that the minimum central pressure was reported by reconnaissance aircraft.

The WSR-88D (Weather Surveillance Radar - 1988 Doppler) at Wilmington, North Carolina, measured winds in excess of 120 knots aloft as the inner convective bands approached the Cape Fear area at 2130 UTC 5 September.

A ship with call sign **LAVX4** reported 85 knot winds and a pressure of 984 mb at 1800 UTC 5 September while located about 60 n mi northeast of the hurricane center. Several other ship reports were helpful in defining the extent of tropical storm force winds, as were reports from a network of drifting buoys deployed offshore of the Carolinas in advance of Fran. Table 2 lists ship reports of at least tropical storm force winds in the vicinity of Fran.

Several wind gusts to hurricane force were measured from coastal areas in North Carolina. As usual for landfalling hurricanes, however, reports of sustained hurricane force winds are difficult to find. Table 3 lists selected U.S. surface observations. The NOAA C-MAN station at Frying Pan Shoals (about 50 n mi south-southeast of Wilmington, North Carolina) reported sustained winds of 79 knots and gusts to 108 knots from a tower about 80 feet above sea level.

Numerous pressure and wind reports from North Carolina were relayed to the NHC through amateur radio volunteers. The lowest measured pressure was 954 mb from Southport. The highest measured wind gust was 119 knots at an elevation of 30 feet (mounted on a house approximately 4 feet above the chimney) from a Davis wind instrument located on Hewletts Creek in Wilmington. A gust to 109 knots was measured in Wrightsville Beach. Although these measurements are very much desired to supplement the more official observations, they will not be listed in Table 3 until their accuracy is verified.

Several tornadoes were indicated by Doppler radar in North Carolina and Virginia. Confirmation, however, has been difficult due to the extensive nature of straight line wind damage across the region.

At the time of this report, a post-storm high water mark survey was being conducted by the U.S. Army Corps of Engineers and the U.S. Geological Survey. Many high water marks remain to be surveyed and "tied into" bench marks. The locations of the maximum values cannot be finalized until the survey is complete. However, initial survey results show an extensive storm surge along the North Carolina coast primarily

southwest of Cape Lookout. Still water mark elevations on the inside of buildings, indicative of the storm surge, range from 8 to 12 feet. Outside water marks on buildings or debris lines are higher due to the effect of breaking waves.

Rainfall totals exceeding six inches were common near the path of Fran. WSR-88D radar precipitation estimates were as high as 12 inches over portions of Brunswick and Pender counties in North Carolina. Extensive flooding spread well inland from the Carolinas into Virginia, West Virginia and Pennsylvania. Some of this flooding was considered the most severe in years. Near Washington, D.C., for example, the Old Town district of historic Alexandria was partially evacuated as the Potomac River rose, flooding streets with more than three feet of water. The next update of this report will include an analysis of rainfall along the path of Fran to be provided by the NWS Eastern Region Headquarters.

c. Casualty and Damage Statistics

According to Associated Press reports, Hurricane Fran was responsible for 34 deaths. Most of the deaths were caused by flash flooding in the Carolinas, Virginia, West Virginia and Pennsylvania. Twenty-one died in North Carolina alone. However, the total death count will likely be revised downward in the next update of this report based on data from NWS personnel to be published in Storm Data, since the NWS attempts to list deaths **directly** attributable to the weather. For example, most vehicle accidents and heart attacks from over-exertion after a hurricane are not considered direct deaths.

Storm surge on the North Carolina coast destroyed or seriously damaged numerous beachfront houses. Widespread wind damage to trees and roofs, as well as downed power lines, occurred as Fran moved inland over North Carolina and Virginia. Extensive flooding was responsible for additional damage in the Carolinas, Virginia, West Virginia, Maryland, Ohio and Pennsylvania.

Nearly a half-million tourists and residents were ordered to evacuate the coast in North and South Carolina. Press reports from Reuters News Service stated that 4.5 million people in the Carolinas and Virginia were left without power.

The Property Claim Services Division of the American Insurance Services Group reports that Fran caused an estimated $1.6 billion dollars in insured property damage to the United States. This estimate includes $1.275 billion in North Carolina, $20 million in South Carolina, $175 million in Virginia, $50 million in Maryland, $20 million in West Virginia, $40 million in Pennsylvania and $20 million in Ohio. A conservative ratio between total damage and insured property damage, compared to past landfalling hurricanes, is two to one. Therefore, the total U.S. damage estimate is $3.2 billion.

d. Forecast and Warning Critique

During Fran's life as a tropical storm or hurricane, the average official track forecast errors ranged from 66 n mi at 24 hours (37 cases) to 137 n mi at 48 hours (33 cases) to 185 n mi at 72 hours (29 cases). These errors are at least 25 percent less than the previous ten-year

averages of the official track errors.

The BAMD (deep-layer Beta and Advection Model) and the GFDI (interpolated version of the Geophysical Fluid Dynamics Laboratory model) provided the best guidance in terms of the lowest track forecast errors. However, the GFDI model showed a distinct bias to the left of the actual track (Figure 4) (77K GIF). The guidance from this model, which is generally acknowledged to be the most accurate one operationally available to the NHC, resulted in some left bias in the official forecasts near landfall.

Most NHC intensity forecast errors were 15 knots or less. All but one intensity forecast made after 2100 UTC 02 September correctly indicated a landfalling category three hurricane.

Table 4 lists the various watches and warnings that were issued. Hurricane warnings were posted for the hardest hit portions of the North Carolina coast about 27 hours prior to landfall.

Acknowledgments

Some of the information in this report was provided by NWS offices in the Eastern Region and is greatly appreciated. Stephen Baig prepared Fig. 1, and Mike Hopkins assisted with Table 3.

Table 1. Best track, Hurricane Fran, 23 August - 8 September, 1996

Date/Time (UTC)	Position		Pressure (mb)	Wind Speed (kt)	Stage
	Lat. (° N)	Lon. (° W)			
23/1200	14.0	21.0	1012	25	tropical depression
1800	14.1	22.8	1011	25	"
24/0000	14.2	24.8	1010	25	"
0600	14.2	26.6	1009	30	"
1200	14.1	28.2	1009	30	"
1800	14.1	29.6	1009	30	"
25/0000	14.1	30.8	1009	25	"
0600	14.3	32.0	1009	25	"
1200	14.6	33.4	1009	25	"
1800	14.7	35.1	1009	25	"
26/0000	14.9	37.0	1009	25	"
0600	15.1	38.6	1009	25	"
1200	15.3	40.0	1009	30	"
1800	15.2	41.4	1008	30	"
27/0000	14.9	42.7	1007	30	"
0600	14.7	43.8	1006	30	"

29/0000	16.4	53.7	987	65	hurricane
0600	17.0	55.0	987	65	"
1200	17.8	56.3	988	65	"
1800	18.6	57.5	988	65	"
30/0000	19.1	58.5	991	65	"
0600	19.4	59.4	991	65	"
1200	19.8	60.1	989	65	"
1200	21.1	61.4	984	65	hurricane
1800	21.5	61.7	983	65	"
01/0000	21.7	62.1	978	65	"
0600	21.9	62.6	982	65	"
01/1200	22.2	63.2	982	70	"
1800	22.5	63.9	981	75	"
02/0000	22.9	64.7	978	75	"
0600	23.3	65.7	976	75	"
1200	23.6	66.7	976	75	"
1800	23.9	67.9	976	75	"
03/0000	24.2	69.0	977	75	"
0600	24.4	70.1	975	80	"
1200	24.7	71.2	973	80	"
1800	25.2	72.2	968	85	"
04/0000	25.7	73.1	961	95	"
0600	26.4	73.9	953	100	"
1200	27.0	74.7	956	105	"
1800	27.7	75.5	952	105	"
05/0000	28.6	76.1	946	105	"
0600	29.8	76.7	952	105	"
1200	31.0	77.2	954	100	"
1800	32.3	77.8	952	100	"
06/0000	33.7	78.0	954	100	"
0600	35.2	78.7	970	65	"
1800	38.0	79.4	995	30	tropical depression
07/0000	39.2	79.9	1000	30	"
0600	40.4	80.4	1001	30	"
1200	41.2	80.5	1001	30	"
1800	42.0	80.4	1000	30	"
08/0000	42.8	80.1	999	30	"
0600	43.4	79.9	999	30	"
1200	44.0	79.0	1000	25	"
1800	44.5	77.6	1001	25	"
09/0000	44.9	75.9	1002	25	extratropical
0600	45.4	74.0	1004	20	"
1200	45.7	72.3	1006	15	"
1800	46.0	71.1	1008	15	"
10/0000	46.7	70.0	1010	15	"
0600					absorbed by a front

05/0000	28.6	76.1	946	105	**minimum pressure**
06/0030	33.9	78.7	954	100	**landfall near Cape Fear, NC**

Table 2. Ship reports of 34 knots or higher wind speed, associated with Hurricane Fran, August-September 1996.

date/time (UTC)	ship name	latitude (°N)	longitude (°W)	wind dir/ speed (knots)	pressure (mb)
30/0000	**AMAGISAN**	24.7	58.1		1017.0
30/0600	**AMAGISAN**	23.9	57.1		1015.0
30/1200	**AMAGISAN**	23.1	55.9		1015.0
30/1800	**AMAGISAN**	22.1	54.7		1014.0
31/0000	**AMAGISAN**	21.2	53.5		1014.5
31/0600	**AMAGISAN**	20.3	52.3		1014.0
31/1200	**SHIP**	26.7	60.8		1014.3
03/0600	**SEALAND CRUSADER**	26.8	67.3		1011.0
04/0000	**ELSX2**	28.4	74.6		1008.5
05/1200	**KAAPGRACHT**	32.2	79.6	010/66	1006.5
	LAVX4	32.9	76.7		1001.0
	ELRV2	32.9	77.4		1004.0
	SUNBELT DIXIE	33.2	77.3		1004.5
	CR MARSEILLE	33.6	77.1		1006.5
	CRISTOFORO COLOMBO	34.7	74.2		1013.0
05/1500	**LAVX4**	32.8	76.8		994.5
	ELRV2	33.2	76.7		1000.5
05/1800	**LAVX4**	33.0	76.9	100/85	984.0
	CR MARSEILLE	34.5	75.6		1007.0
05/2100	**CRISTOFORO COLOMBO**	33.0	73.6		1010.0
	ZIM AMERICA	34.7	74.0		1010.0
	OOCL FIDELITY	35.8	74.0		1012.0
06/0000	**COPACABANA**	31.5	72.9		1013.0
	CRISTOFORO COLOMBO	32.5	74.2		1010.0
	ZIM AMERICA	34.3	74.1		1009.0
	OOCL FIDELITY	35.4	74.2		1010.0
06/0300	**OOCL FIDELITY**	35.0	74.7		1007.0

06/0600	LAVX4	33.3	76.2		1006.0
	CR MARSEILLE	33.9	73.5		1013.2
06/0900	ZIM AMERICA	33.6	75.4		1009.0

Table 3. Hurricane Fran selected surface observations, September, 1996.

ocation	Press. (mb)	Date/time (UTC)	Sustained wind (kt) [a]	Peak gust (kt)	Date/time (UTC) [b]	Storm surge (ft) [c]	Storm tide (ft) [d]	Storm total rain (in.)
uth Carolina								
harleston (CHS)	998.0	05/2234	27		05/2330			1.10
harleston ity Office			29		05/1850	1.1		0.87
Cheraw	992.2				06/0315			1.32
erry Grove Pier				67	05/2215			8.36
Conway								5.02
Dillon								4.62
Florence			30 [M]		06/0250			2.21
arden City Pier				64	05/2215			5.91
Loris								5.14
Marion								3.01
Mullins								3.98
rtle Beach Pavilion				66	05/2215			
rtle Beach Pier				65	05/2215	3.6		7.02
rth Carolina								
ex (South RDU)								6.06
Atlantic Beach				87				
Butner								6.21
pe Lookout	987.0							
erry Point A (NKT) [M]	993.9	06/0255		66	06/0255			
uck Pier						1.5		
ke Marine Lab Beaufort)				80		5.4		
zabeth City G (ECG)	1005.1	06/1147			06/1255			
ayetteville (FAY)	971.6	06/0430		69	06/0430			
gure Eight Island							10-12 [e]	
ort Bragg (FBG)	972.3	06/0246		64	06/0431			4.70
Graham								6.65
reensboro	984.4	06/0900	30		06/0537			3.91

(GSO)								
Greenville				87				
lden Beach					05/2300			
lew River	982.0	05/0230		82				7.05
Newport								3.24
rth Topsail Beach			65		05/0045		8-9 [e]	
egon Inlet						2.3		
ope AFB (POB)	977.6	06/0455			06/0418			6.72
Raleigh-Durham (RDU)	977.6	06/0653		69	06/045			8.80
cky Mount (RWI) *	980.7	06/0200	17		06/0445			3.68
ugemount urham Co)								6.02
Seymour Johnson (GSB)	981.0	06/0555		70	06/0555			6.38
Southport tate Pilot Office				91				
/ilmington (ILM)	961.4	06/0036		75	05/2349			
/ilmington de Gauge						5.5		
rightsville Beach							10-11 [e]	
OAA Ship **Whiting** [f]	959.9	05/2135						
rginia								
arlottesville (CHO) [M]	998.6	06/1645	22		06/1045			
Danville (DAN) [M]	987.5	06/1151			06/0449			
ot Springs (HSP) [M]	1002.4	06/1400	29		06/1540			
ynchburg (LYH) [M]	990.6	06/1454	18		06/1243			
rfolk NAS (NGU)	1004.6	06/0855			06/0805	2.6		
Richmond (RIC)	1000.8	06/1141	32		06/1141			
Roanoke (ROA) [M]	994.7	06/1254	33		06/0954			
Staunton (SHD) [M]	997.6	06/1840	25		06/1120			
ashington D.C. [g]						5.6/7.3		
MAN Stations								
rying Pan Shoals (FPSN7)	960.6	05/2300	79	108	05/2100			
Diamond Shoals (DSLN7)	1006.6	06/0500		65	06/0400			
pe Lookout (CLKN7)	996.9	06/0100		71	06/0300			

Folly Island (FBIS1)	997.6	05/2200	24		05/1900			

[a] NWS standard averaging period is 1 min; ASOS and C-MAN are 2 min; buoys are 8 min.

[b] Date/time is for sustained wind when both sustained and gust are listed.

[c] Storm surge is water height above normal astronomical tide level.

[d] Storm tide is water height above NGVD.

[e] Estimated.

[f] Docked at Wilmington State Pier.

[*] Station not reporting from 02-10Z 06 Sept.

[M] Taken directly from METAR reports.

[g] The 5.6 ft value occurred on 06 Sept at 17 UTC, and was the actual storm surge, the 7.3 ft value occurred as a much broader peak on 09 Sept at 0418 UTC, from freshwater runoff.

Table 4. Watch and warning summary, Hurricane Fran, 23 August - 8 September, 1996.

Date/time (UTC)	Action	Location
29/0300	[illegible]	Northeastern Leeward Islands from Antigua through St. Maartin
29/2100	hurricane watch discontinued	Northeastern Leeward Islands from Antigua through St. Maartin
	[illegible]	Central Bahamas
	[illegible]	Central Bahamas
03/0900	[illegible]	Northwestern Bahamas
03/1800	hurricane warning	Northwestern Bahamas
04/0300	[illegible]	north of Sebastien Inlet, FL to Little River Inlet, SC
04/0900	watches and warnings discontinued	Central Bahamas
04/1500	[illegible]	Little River Inlet, SC to Oregon Inlet, NC including Pamlico Sound
04/1800	hurricane warning downgraded to [illegible]	Northwestern Bahama Islands of Andros and New Providence
04/2100	hurricane warning	north of Brunswick, GA to Cape Lookout, NC
	[illegible]	north of Cape Lookout, NC to Currituck Beach Light, NC including Pamlico and Albemarle Sounds
	[illegible]	Flagler Beach, FL to Brunswick, GA
	hurricane watch discontinued	south of Cape Lookout, NC
05/0300	hurricane warning extended northward	north of Cape Lookout, NC to NC/VA border including the Pamlico and Albemarle Sounds
	[illegible]	north of NC/VA border to Chincoteague, VA including the Greater Hampton Roads area
	hurricane warning downgraded to [illegible]	northwestern Bahama Islands of Abaco and Grand Bahama
	hurricane warning discontinued	northwestern Bahama Islands
	tropical storm warning discontinued	Andros and New Providence Islands
05/0900	tropical storm warning discontinued	Flagler Beach, FL to Brunswick, GA
	tropical storm warning	northwestern Bahama Islands of Abaco and

	discontinued	Grand Bahama
05/1500		north of the NC/VA border to Chincoteague, VA including the Greater Hampton Roads area
		lower Chesapeake Bay
	hurricane warning downgraded to	north of Brunswick, GA to just south of Edisto Beach, SC
06/0100	hurricane and tropical storm warnings discontinued	Cape Romain, SC southward
06/0300	hurricane warnings discontinued	south of Cape Fear, NC
	hurricane watch discontinued	north of the NC/SC border to Chincoteague, VA including the Greater Hampton Raods area
06/0900	hurricane warning discontinued	remainder of NC coast
06/1800	tropical storm warning discontinued	remainder of U.S. east coast

ber 28, 1998

Preliminary Report
Hurricane Bertha
05-14 July 1996

Miles B. Lawrence
National Hurricane Center
9 November 1996

PRELIMINARY REPORTS
Tropical Storm Arthur
Hurricane Bertha
Hurricane Cesar
Hurricane Dolly
Hurricane Edouard
Hurricane Fran
Tropical Storm Gustav
Hurricane Hortense
Hurricane Isidore
Tropical Storm Josephine
Tropical Storm Kyle
Hurricane Lili
Hurricane Marco

Bertha was an early-season Cape Verde Hurricane that moved across the islands of the northeastern Caribbean Sea as a category 1 hurricane on the Saffir/Simpson scale and made landfall on the North Carolina coast near Wilmington as a category 2 hurricane. Bertha's one-minute winds reached their maximum value of 100 knots on 9 July, while located to the north of Puerto Rico. The last Hurricane to reach this strength, this early in the season, was Alma in 1966 (117K GIF) in the eastern Gulf of Mexico with 110 knots. Bertha is responsible for an estimated eight deaths and $250 million in U.S. damages.

a. Synoptic History

Bertha originated from a tropical wave which moved from Africa to the Atlantic on 1 July. A weak circulation was first detected on satellite imagery on 3 July, centered about 500 n mi south of the Cape Verde Islands in the far eastern Atlantic Ocean. The track of the circulation center begins on 5 July, when the circulation is believed to have reached the surface and become a tropical depression, in the central tropical Atlantic. This track is displayed in Fig. 1 (102K GIF) and listed in Table 1.

Bertha followed a fairly smooth curved path around the western periphery of the Atlantic subtropical high pressure ridge. This ridge changed little during Bertha's existence and a weak mid-level trough persisted in the western North Atlantic. For three days, the depression moved toward the west-northwest at the fast forward speed of 20 to 25 knots and strengthened to a hurricane with 1-min. maximum sustained winds of 75 knots on the 8th as the center moved across the Leeward and Virgin Islands of the northeastern Caribbean. The center moved between Antigua and Barbuda at 0600 UTC on the 8th, across St. Barthelemy, Anguilla, and St Martin, just north of St.

Thomas, and over the British Virgin Islands by 1800 UTC.

The track gradually turned northwestward on the 9th and maximum sustained winds reached 100 knots at 0600 UTC. Bertha was centered 120 n mi north of Puerto Rico at this time, but earlier passed within 30 n mi of this island. The strongest winds were located in the northeast quadrant of the hurricane and most of Puerto Rico experienced only tropical storm conditions, except for Culebra, over which hurricane-force winds might have occurred.

Moving northwestward at a slower forward speed of 15 to 20 knots, the center of Bertha moved parallel to the Bahama islands, passing 40 to 60 n mi northeast of the Turks and Caicos islands, San Salvador, Eleuthera and the Abacos. Again, the strongest winds were located to the northeast of the center, but 65-knot sustained winds might have reached some of the above mentioned islands.

Continuing on its gradual turn, the track became north-northwestward on the 10th and 11th and the center moved parallel to the coast of Florida and Georgia at a distance of 150 to 175 n mi offshore. During this time, the forward speed slowed to about 8 knots. Moving northward and re-accelerating to a forward speed of 15 knots, Bertha made landfall at 2000 UTC on the 12th on the coast of North Carolina, with the center crossing the coast midway between Wrightsville and Topsail Beaches. The hurricane had been gradually weakening since its top speed of 100 knots on the 9th to 70 knots on the 11th. Then, in 12 hours just before landfall, the winds increased to 90 knots, which is the estimated maximum 1-min. wind speed at landfall. Bertha quickly dropped below hurricane strength when it moved inland over eastern North Carolina.

It then moved northeastward along the U.S. east coast, producing [illegible] sustained winds over land from northern North Carolina to New England and 60 knot winds over nearby Atlantic waters. Bertha was declared extratropical on the 14th when the center moved from the Maine coast to New Brunswick, Canada. The extratropical storm brought 40 to 50 knot winds to the Canadian Maritime Provinces and was tracked to just south of Greenland on the 17th.

b. Meteorological Statistics

Figures 2 and 3 (64K GIF) show a plot, versus time, of the various data used to estimate the minimum central sea-level pressure and the maximum 1-min. wind speed, 10 m above ground. Included are data from reconnaissance aircraft and satellite Dvorak-technique wind speed estimates. Table 2 lists selected surface observations of lowest pressure, peak wind, storm surge and rainfall values. Table 3 lists ship reports of 34 knots or greater that were associated with Bertha. The minimum pressure of 960 mb occurred at 0600 UTC on the 9th and is based on a dropsonde measurement. The best track maximum sustained wind speed of 100 knots at the same time is based on a 700-mb flight-level wind speed of 122 knots, measured 19 n mi east-northeast of the center.

Observations are incomplete from the Leeward and Virgin Islands, but because the circular eyewall was 20 - 30 n mi across, it is

believed that hurricane conditions with sustained wind speeds to 75 knots, could have occurred on Antigua, Barbuda, Nevis, St. Eustatius, St. Bathelemy, Anguilla, St. Martin, and from St. Thomas northward through the U.S. and British Virgin Islands. Experience with Hurricane Marilyn in 1995 suggests that even higher sustained winds can occur over mountainous terrain as is found on many of these islands. Winds of [illegible] were experienced over portions of Puerto Rico as indicated by the San Juan observations in Table 2.

A reconnaissance aircraft flight level wind speed of 110 knots in the northeast quadrant of the circulation several hours before landfall is the basis for estimating sustained surface winds of 90 knots on the coast at landfall. The lowest sea-level pressure observed at landfall was 977 mb at Surf City, North Carolina and a value of 974 mb is assumed to be the minimum pressure at landfall.

Storm total rainfall amounts ranged from 5 to 8 inches along a coastal strip from South Carolina to Maine.

Coastal storm surge flood heights, from Florida through New England, ranged from 1 to 4 feet, but values to 5 feet were estimated on the North Carolina coast from Cape Fear to Cape Lookout. A storm surge of 6 feet or a little higher is indicated near Swansboro, where 5 to 6 feet of water was "inside of businesses on the waterfront".(from Newport, North Carolina National Weather Service Forecast Office Preliminary Storm Report).

Seven tornadoes have been confirmed, and these occurred during the passage of an outer rain band. There were five tornadoes in Virginia, one in North Carolina and one in Maryland.

c. Casualty and Damage Statistics

Twelve deaths have been related, in some way, to Hurricane Bertha. One, in Florida, was from an evacuating military jet crashing into a house. One death from an auto accident occurred in North Carolina and another drowned in rip currents. A surfer died in New Jersey. In Puerto Rico, two died in an automobile accident and another died while surfing. On the French half of St. Martin, one person was electrocuted and one fell off a boat.

The U.S. Virgin Islands, along with North Carolina, has been declared a federal disaster area. Surveys indicate that Bertha damaged almost 2500 homes on St. Thomas and St. John. For many, it was a second hit in the ten months since Hurricane Marilyn devastated the same area.

It is likely that there was beach erosion on the north coast of the Dominican Republic as Bertha passed to the north. The Bahamas were also affected by the weak side of the hurricane, but there are no damage figures available from either of these locations.

The primary effects in North Carolina were to the coastal counties and included storm surge flooding and beach erosion, roof damage, piers washed away, fallen trees, and damage to crops. A survey indicated over 5000 homes damaged, mostly from storm surge. A Federal Emergency Management Agency (FEMA) estimate of the

number of persons in South and North Carolina who evacuated is 750,000. Minor wind damage and flooding also spread along the path of the storm all the way to New England.

The American Insurance Association reports an estimate of $135 million dollars in insured property damage, primarily along coastal North Carolina. A conservative ratio between total damage and insured property damage, compared to past land falling hurricanes, is two to one. Then the total U.S. damage estimate is 2 times $135 million or $270 million dollars. No figures are available from the Caribbean.

d. Forecast and Warning Critique

Bertha moved on a fairly smooth track. The average official track forecast errors for Bertha ranged from 80 n mi at 24 hours (32 cases) to 147 n mi at 48 hours (29 cases) to 224 n mi at 72 hours (27 cases). These errors are 15 per cent, or more, lower than the previous ten-year averages of the official track errors and are from 15 to 40 per cent lower than the CLIPER forecast errors for the same cases.

Overall, the track model guidance also performed very well. However, the 0000 UTC Aviation Model run on the 9th, when Bertha was located just north of Puerto Rico, (inexplicably?) showed the track recurving significantly further east than the previous run. All of the track guidance models that use the Aviation Model as a background environment also showed a similar track. This resulted in rather large official track forecast errors on the 9th, with a 613 n mi 72-hour error on the 1200 UTC forecast. The Aviation Model and some of the track guidance models recovered to an excellent forecast only 12 hours later. Fortunately, this guidance problem occurred three days prior to landfall in North Carolina and did not have a significant impact on U.S. warnings or on warnings for the Bahamas.

Table 4 lists the various watches and warnings that were issued. Hurricane warnings were issued from Sebastian Inlet, Florida to Chincoteague, Virginia as well as for the Bahamas and for the islands of the northeastern Caribbean Sea from Antigua through Puerto Rico. Tropical storm warnings were issued from Sebastian Inlet to north of Deerfield Beach, Florida and from north of Chincoteague to Watch Hill, Rhode Island. Almost all of the U.S. east coast was involved with some watch or warning and this is the result of the storm track's expected close passage to the southeast U.S. coast. The hurricane watch for the North Carolina landfall area was issued 65 hours before landfall and the hurricane warning was issued 47 hours before landfall. This is far more than the 36- and 24-hour lead times that the National Hurricane Center strives for and is the result of the forward motion decreasing at a faster rate than expected.

Table 1. Best track, Hurricane Bertha, 5 - 14 July, 1996 (updated 4 August 1996)

Date/Time	Position		Pressure	Wind Speed	Stage
	Lat.	Lon. (°			

(UTC)	(°N)	W)	(mb)	(kt)	
05/0000	9.8	34.0	1009	30	tropical depression
0600	10.2	36.3	1008	30	"
1800	16.5	58.4	992	70	hurricane
08/0000	17.0	60.1	988	75	"
0600	17.5	61.8	985	75	"
1200	18.0	63.5	983	70	"
1800	18.6	64.9	978	75	"
09/0000	19.4	66.1	970	80	"
0600	20.3	67.7	960	100	"
1200	21.4	69.4	965	100	"
1800	22.5	71.1	967	90	"
10/0000	23.6	72.6	969	85	"
0600	24.5	74.0	971	80	"
1200	25.4	75.3	968	80	"
1800	26.4	75.8	966	80	"
11/0000	27.5	76.4	968	75	"
0600	28.3	76.8	972	75	"
1200	29.2	77.5	977	75	"
1800	30.0	78.0	980	70	"
12/0000	30.7	78.3	982	70	"
0600	31.2	78.6	984	70	"
1200	32.2	78.4	975	85	"
1800	33.6	78.1	974	90	"
13/0000	35.0	77.6	993	65	"
1200	46.0	66.0	995	50	extratropical
1800	47.0	62.0	995	50	"
15/0000	48.0	57.0	995	50	"
0600	49.0	52.0	996	45	"
1200	51.0	47.0	996	40	"
1800	54.0	44.0	996	40	"
16/0000	57.5	42.5	991	40	"
0600	58.5	42.5	988	40	"
1200	59.5	42.0	988	45	"
1800	59.8	41.0	985	45	"

17/0000	60.0	40.0	993	40	"
0600	60.5	39.0	1001	35	"
09/0600	20.3	67.7	960	100	**minimum pressure**
12/2000	34.3	77.8	974	90	**landfall * midway between Wrightsville and Topsail Beaches**

The eyewall also passed over Antigua, Barbuda, St. Barthelemy, Anguilla, St Martin, St Thomas, and the British Virgin Islands and passed close to a number of other islands in the northeastern Caribbean Sea.

Table 2. Hurricane Bertha selected surface observations, July 1996 (updated 20 August, 1997).

Location	Press. (mb)	Date/time (UTC)	Sustained wind (kt) [a]	Peak gust	Date/time (UTC) [b]	Storm surge (ft) [c]	Storm tide (ft) [d]	total rain (in.)
Antigua	991 [f]	08/0600	30 [f]		08/0400			
Florida:								
Jacksonville	1011.9	11/2256	22 (2 min)	27	11/1721			trace
Jacksonville Beach							2	
Georgia:								
Sea Island							3	
St. Simon							3	
South Carolina:								
Charleston Buoy (41004)	998.2	12/1200			12/0800			
Charleston city office					12/1130			0.94
Charleston harbor						2.7		
Charleston international airport	1008.5	12/1155	30 (2-min.)		12/0130			1.48
Cheraw								0.38
Cherry Grove pier				68				2.17
Folly Beach FBIS1 C-MAN	1006.8	12/1200			11/2100			
Garden City pier								1.01
Loris								2.77
Myrtle Beach	1003.7	12/1532	31		12/1512			2.40
Myrtle Beach, Sands Resort								4.73
Myrtle Beach Springmaid pier					12/1500	3.3		
Myrtle Beach pavilion								1.64

Summerville								1.40
North Carolina:								
Alligator River					13/0300			
Beaufort Duke marine lab				82	12/2200	2.8		
Beaufort (MRH)					12/2213			
Bath							6	
Bellhaven							7	
Bogue Field ASOS				71	13/0107			
Broad Creek								6.50
Brunswick							5	
Cape Lookout CLKN7 C-MAN (32 ft asl)	1002.0	12/2200		73	12/1837			
Carolina Beach							6	
Cherry Branch								5.09
Cherry Point (NKT)	995.7	12/2255		64	12/2304			
Diamond Shoals DSLN7 C-MAN (153 ft asl)	1007.7	13/0300		79	12/2345			
Duck DUCN7 C-MAN	1003.9	13/0500			13/0500			
East Wilmington				70				
Elizabeth City (ECG)	998.9	13/1313			13/0055			
Englehard			28 [f]		13/0300			
Fayetteville					12/2150			
Ft. Bragg					13/0055			
Frying Pan Shoals FPSN7 CMAN (145 ft asl)	977.5	12/1800	77 (10 min)	101	12/1610			
Greenville				76				4.11
Hatteras ASOS					12/2131			
Hatteras ferry ofice					13/0100			
Hatteras WSO	1007.1	13/0130			12/2243			
Holden Beach				70 [f]	12/1630			
Kure Beach				80	12/1835			
Lake Waccamaw								2.39
Lumberton (LBT)	1003.1	12/2156	26 (2-min)	33	12/2325			
Manteo					13/0345			

Newport	994.3	12/2200		78				2.95
New Bern					12/2208			4.56 [e]
New River (NCA)	980.8	12/2200	70	94	12/2021			
N Topsail Beach			67 [f]		12/2030			
Oregon Inlet					13/0300			
Pongo River							4.5	
Seymour Johnson AFB	986.3	12/2355	33		12/2155			4.03
Snow Hill								5.44
S. Pamlico River							3	
Southport (Nixon)	978.3	12/1835		74	12/1703			
Surf City (Horodner)	977	12/2005						
Swansboro							8	
Topsail Beach			68 [f]		12/2000			
Williamston								4.10
Wilmington (ILM)	978.7	12/2028			12/1902	1.3		5.66
Wilmnington (Armquist)	975.6	12/2000			12/2200			
Wilmnington, Fig. Eight Is.				83	12/1725			
Wilmington NC state port				77				
Wilmington port terminal	980.1	12/1850	from NOAA ship **Whiting**, 34.2N 77.96W					
Wrightsville Bch. Banks ch.				80				
Virginia:								
Cape Charles					13/0330			
Cape Henry				67	13/0600			
Chesapeake Bridge-Tunnel					13/0900			
Chesapeake Light Stn. CHLV2 C-MAN	998.9	13/0800			13/0700			
Eastville, Northhampton Co.								7.00
False Cape Buoy (44014)	1004.1	13/0900			13/0900			
Fenwick Is. Buoy (44009)	997.1	13/1400			13/1300			
Ft. Belvoir	1002.0	13/1055			13/1700			
Ft. Eustis	993.1	13/0755			13/0203			
Langley AFB	993.5	13/0755			13/0215			
Newport News (PHF)	993.1	13/0750	30		13/0228			
Norfolk								

International airport	995.1	13/0756	31		13/0740			2.44
Norfolk NAS (NGU)	994.4	13/0755	30		13/0155			
Norfolk, Sewells Point						2.5		
Oceana NAS (NTU)	997.2	13/0755			13/0615			
Pasquotank River							5	
Plantation Creek								7.20
Potomac river at Wisc. Ave.							5	
Wallops Island					13/0605			
Washington Dulles airport				29	13/1218			1.12
Washington National airport	1001.7	13/1221			13/0639			1.24
Willis Wharf, Accomac Co.								5.80
Maryland:								
Andrews AFB (ADW)	1000.6	13/1155			13/0750			0.94
Baltimore Washington airport	1000.3	13/1349			13/0704			2.28
Nanticoke, Wicomico Co.								5.03
Patuxent River NAS (NHK)	995.0	13/1100			13/0603			4.03
Salisbury	995.2	13/1240						5.62
Thomas Point TPLM2 C-MAN	998.8	13/1200	29		13/1700			
Delaware								
Cape Henlopen					13/1335			
Dover	995.6	13/1155	30					
Lewes					13/1250	1.58		
Wilmington	998.3	13/1451			13/2051			
New Jersey								
Atlantic City	994.9	13/1554			13/1111	2.27		2.41
Avalon					13/1409			
Estelle Manor								6.59
Harvey Cedars								
Millerville	995.2	13/1445			13/0950			
Newark airport	996.6	13/1909	25 (2-min.)		13/1521			
Teterboro airport	997.3	13/1945	26 (2-min.)		13/1547			
River Vale								2.17
West Milford								4.85

Pennsylvania								
Philadelphia	997.5	13/1551	29					2.43
New York:								
Ambrose Light Tower ALSN6 C-MAN	994.5	13/1900			13/1500			
Babylon Village, L.I.				64				
Brookhaven airport			26		13/1947			
East Quogue, Suffolk co.								0.76
Farmingdale	995.3	13/2045						
Fire Is. Buoy (44025)	995.4	13/2000	33		13/1900			
Islip	994.8	13/2050	27		13/1557			
JFK airport	995.6	13/1942	31 (2-min.)		13/1458			
LaGuardia airport	995.9	13/1951	29 (2-min.)		13/1518			
Mt. Sinai (New York City)								2.49
Ossining, Westchester Co.								3.09
Pomona, Rockland Co.								4.65
Westhampton Beach	995.6	13/2045						
Connectucut:								
Bridgeport airport	995.5	13/2054	27		13/1547			
Danbury	996.3	13/2252						
Groton	995.9	13/2245						
Hartford	997.0	13/2245						
New Haven	995.6	13/2145						
Orange								
Preston				48				
Shelton								4.06
Vernon								5.50
Rhode Island:								
Fox Point hurricane barrier						2.1		
Sachuest Point (Middletown)				64	14/0010 [e] hand-held anemometer			
Providence	995.9	13/2336			13/1926			5.41
Massachusetts:								
Buzzards Bay Buoy (44028)	997.1	14/0000			14/0000			
Goshen								5.70
Billerica								7.20
Boston	996.3	14/0056						

New Bedford				76	13/2030	1.7		
Taunton ASOS	995.6	14/0041						
Puerto Rico:								
Lake Matrullas								3.02 [g]
Pueblito Del Rio								5.64 [g]
Quebrada Guava								6.84 [g]
Rio de la Plata								4.81 [g]
Rio Icacos								8.17 [g]
Rio Icacos Met Station								7.79 [g]
Rio Saliente								3.78 [g]
Roosevelt Roads	992.0	08/1930			08/1525			1.60
San Juan	996.8	08/2056			08/2110			1.56
St. Maarten	985.6	08/0935		70	08/0900-1000			
Virgin Islands:								
Bonne Resolution Gut, St. Thomas								1.44 [g]
Cane Bay, St. Croix							10-12	
Coral Bay, St. John								3.00 [g]
HESS Oil, St. Croix					08/1918			
Mt Zion, St. Thomas								3.28 [g]
Wintberg, St. Thomas								2.12 [g]

[1] Averaging period is 1 min. unless otherwise indicated.
[2] Date/time is for sustained wind when both sustained and gust are given.
[3] Storm surge is water height above normal astronomical tide level.
[4] Storm tide is water height above National Geodetic Vertical Datum.
[5] Top of rain gage blew off and "a lot of rain was sucked out".
A more extreme value may have occurred.
[6] 24 hour total.

Table 3. Ship reports of 34 knots or higher wind speed, associated with Hurricane Bertha, July 1996.

date/time (UTC)	ship name	latitude (°N)	longitude (°W)	wind dir/ speed (knots)	pressure (mb)
07/1200	**FORT ROYAL**	17.1	53.8		1014.2

08/1800	MAYAGUEZ	21.6	64.3		1013.0
09/0000	SEALAND CONSUMER	21.6	64.7		1009.1
09/0300	MAYAGUEZ	20.0	64.6		1007.0
	SEALAND CONSUMER	21.0	65.0		1008.9
09/0600	MAYAGUEZ	16.9	65.1		1007.5
	SEALAND CONSUMER	20.6	65.1		1006.9
09/0900	SEALAND CONSUMER	20.4	65.3		1009.0
09/1800	SEALAND CRUSADER	23.0	67.9		1012.0
	CALAPATRIA	24.3	67.0		1013.2
11/1800	KIRF	27.8	77.8		1006.2
	SEALAND HAWAII	28.5	78.8		1006.0
	C6YC	29.6	73.5		1020.5
	NOBLE STAR	30.8	79.9		1010.0
	AALSMEERGRACHT	31.6	80.4		1010.0
	DSR EUROPE	32.4	72.6		1022.5
11/2100	C6YC	28.9	74.3		1018.8
12/0000	C6YC	28.3	74.8		1017.5
	NOBLE STAR	30.8	80.1		1004.7
	AALSMEERGRACHT	31.0	80.9		1010.0
12/0600	DSR EUROPE	30.7	74.7		1019.0
	AALSMEERGRACHT	31.1	80.6	360/66	1005.0
	SEALAND ATLANTIC	31.3	76.5		1008.0
12/0900	SEALAND ATLANTIC	30.8	76.4		1007.3
12/1200	BELGRAND	28.6	79.7		1015.5
	SEALAND ATLANTIC	30.4	76.4		1008.8
	ELSD9	30.9	75.4		1016.0
	SHIP	34.9	71.1		
12/1500	DSR EUROPE	30.0	77.3		1015.0
12/1800	DSR EUROPE	30.1	78.1		1015.5
	FENELLA	30.5	74.8		1013.0
	ELSD9	30.7	76.3		1017.5
	SHIP	32.7	73.6		1016.8
	ESSO CORAL GABLES	33.8	73.9		1017.8
	EXPORT PATRIOT	32.7	75.2		1022.2

13/0000	ESSO CORAL GABLES	33.6	75.1		1012.2
13/0600	KAIJIN	32.2	73.7		1017.0
	ESSO CORAL GABLES	33.3	76.0		1013.3
13/1200	ZIM CANADA	39.3	73.9		1006.0
	BREMEN EXPRESS	37.9	73.2		1008.1
13/1500	3FEB5	36.5	69.9		1019.6
	BREMEN EXPRESS	37.6	73.9		1006.5
	ZIM CANADA	38.7	74.1		1000.0
13/1800	3FEB5	36.0	70.0		1017.9
	BREMEN EXPRESS	37.3	74.8		1009.6
	ZIM CANADA	38.1	74.3		1005.0
	SONG OF AMERICA	40.6	72.4		1004.0
13/2100	PHAROS	39.5	69.0		1012.6
14/0000	PHAROS	39.6	69.5		1009.8
	NJPJ	41.9	70.3		1006.1
14/0600	PHAROS	39.7	70.4		1013.3
14/0900	A.S.L. SANDERLING	45.0	60.4		1011.4
14/1200	TRITONHIGHWAY	37.4	66.5		1022.0
	ALFRED NEEDLER	43.3	62.6		1007.0
	KASUGA 1	43.9	61.3		1007.8
	A.S.L. SANDERLING	45.2	59.4		

Table 4. Watch and warning summary, Hurricane Bertha, July 1996.

Date/time (UTC)	Action	Location
06/1500		Antigua, Barbuda, Nevis, Montserrat, St Kitts, Anguilla, Saba, St Eustatius, Dominica, and Dutch St Maarten
06/2100		Guadeloupe, St Barthelemy, French St Martin, U.S. and British Virgin Islands
07/0300	hurricane warning	Dominica northward to Anguilla and St Maarten
07/1200		Puerto Rico
07/1500	hurricane warning	U.S. and British Virgin Islands and Puerto Rico
08/0000	tropical storm watch	Dominican Republic from Isla Saona to Cabo Frances Viejo
08/0300		Dominican Republic from Isla Saona to Cabo Frances Viejo
08/0900		Turks and Caicos Islands
08/1200	hurricane warning	Dominican Republic from Cabo Caucedo to Monte Cristo, southeastern Bahamas
08/1500	hurricane warning discontinued	Dominica

08/1800	hurricane watch	Haiti from St Nicolas to border of Dominican Republic
	hurricane warning discontinued	Leeward Islands south and east of St Eustatius
08/2100	hurricane warning	Turks and Caicos Islands and southeastern Bahamas
	hurricane warning discontinued	Leeward Islands
	hurricane watch	central Bahamas
09/0100	hurricane warning discontinued	U.S. and British Virgin Islands
09/0300	hurricane warning discontinued	Puerto Rico
	tropical storm warning	Haiti from St Nicolas to border of Dominican Republic
09/0900	hurricane warning	central Bahamas
	hurricane watch	northwestern Bahamas
09/1500	watches and warnings discontinued	Dominican Republic and Haiti
09/2100	hurricane warning	northwestern Bahamas
10/0300	tropical storm warning	north of Deerfield Beach, FL to Brunswick, GA
	hurricane watch	north of Brunswick to NC/VA border including Pamlico and Albemarle Sounds
10/0900	hurricane warning discontinued	Turks and Caicos Islands and southeastern Bahamas
10/1500	hurricane warning	Sebastian Inlet, FL to Cape Romain, SC
10/1800	hurricane warning discontinued	central Bahamas
10/2100	hurricane warning	Cape Romain to NC/VA border including Pamlico and Albemarle Sounds
	tropical storm warning discontinued	south of Sebastian Inlet, FL
11/0300	hurricane watch	NC/VA border to Chincoteague VA including southern Chesapeake Bay
11/0600	hurricane warning discontinued	northwestern Bahamas
11/0900	hurricane warning discontinued	south of Brunswick, GA
12/0900	hurricane warning discontinued	Savannah, Ga southward
12/1500	tropical storm warning	NC/VA border to Chincoteague, VA including southern Chesapeake Bay
12/1900	hurricane warning discontinued	Cape Romain, SC southward
12/2100	hurricane warning	NC/VA border to Chincoteague, VA including the Hampton Roads area
	tropical storm warning	north of Chincoteague, VA to Watch Hill, RI including the lower Delaware Bay
	tropical storm watch	east of Watch Hill to the Merrimack River, MA
13/0300	hurricane warning discontinued	south of Topsail Beach, NC
	hurricane watch discontinued	lower Chesapeake Bay
	tropical storm warning	all of Chesapeake Bay and the lower tidal Potomac River and all of Delaware Bay
13/0700	hurricane warning to tropical storm warning	Topsail Beach, NC to Chincoteage, VA including Albemarle and Pamlico Sounds
13/0900	hurricane warning discontined	NC/VA border southward
13/1200	tropical storm warning discontinued	south of Fenwick Island, DE

13/1500	tropical storm warning discontinued	south of Brigatine, NJ and Delaware Bay
13/2100	tropical storm warning discontinued	south of Fire Island, NY
14/0000	tropical storm warning discontinued	south of Watch Hill, RI
14/0300	tropical storm warning discontinued	remainder of U.S east coast

ıber 28, 1998

Preliminary Report
Hurricane Bonnie
19-30 August 1998

Lixion A. Avila
National Hurricane Center
24 October 1998

PRELIMINARY REPORTS
Tropical Storm Alex
Hurricane Bonnie
Tropical Storm Charley
Hurricane Danielle
Hurricane Earl
Tropical Storm Frances
Hurricane Georges
Tropical Storm Hermine
Hurricane Ivan
Hurricane Jeanne
Hurricane Karl
Hurricane Lisa
Hurricane Mitch
Hurricane Nicole

Bonnie was the third hurricane to directly hit the coast of North Carolina during the past three years.

a. Synoptic History

The origin of Bonnie was a large and vigorous tropical wave that moved over Dakar, Senegal on 14 August. The wave was depicted on visible satellite imagery by a large cyclonic low- to mid-level circulation void of deep convection. The wave caused a 24-h surface pressure change of -3.5 and -4.0 mb at Dakar and Sal respectively. There was a well established 700 mb easterly jet which peaked at 50 knots just before the wave axis crossed Dakar, followed by a well marked wind-shift from the surface to the middle troposphere. The overall circulation exited Africa basically just north of Dakar where the ocean was relatively cool. However, a strong high pressure ridge steered the whole system on a west-southwest track over increasingly warmer waters and convection began to develop. Initially, there were several centers of rotation within a much larger circulation and it was not until 1200 UTC 19 August that the system began to consolidate and a tropical depression formed. Although the central area of the tropical depression was poorly organized, the winds to the north of the circulation were nearing tropical storm strength. This was indicated by ship observations and high resolution low-cloud wind vectors provided in real time by the University of Wisconsin. The depression was then upgraded to Tropical Storm Bonnie based on these winds and satellite intensity estimates at 1200 UTC 20 August. Bonnie moved on a general west to west-northwest track around the circulation of the Azores-Bermuda High toward the northern Leeward Islands.

The first reconnaissance plane reached Bonnie late on the 20th and measured a minimum pressure of 1004 mb and winds of [illegible] at 1500 feet to the northeast of the center. Bonnie skirted the Leeward Islands and most of the associated weather remained to the north over the open Atlantic. During that period, Bonnie's circulation was very asymmetric.

Under a favorable upper-level wind environment, Bonnie gradually strengthened and became a hurricane at 0600 UTC 22 August when it was located about 200 n mi north of the eastern tip of Hispaniola. At that time, the hurricane hunters found a nearly complete eyewall and flight-level peak winds of 76 knots. Bonnie moved on a general west-northwest heading and reached maximum winds of 100 knots and a minimum pressure of 954 mb about 150 n mi east of San Salvador in the Bahamas.

The ridge to the north of Bonnie temporarily weakened and the

steering currents collapsed. The hurricane then drifted northward for a period of 18 to 24 hours. Thereafter, the subtropical ridge reintensified, forcing Bonnie to move northwestward and then northward toward the coast of North Carolina while the hurricane maintained winds of 100 knots.

After a slight weakening, the eye of Bonnie passed just east of Cape Fear around 2130 UTC 26 August and then made landfall near Wilmington as a border line Category 2/3 hurricane on the Saffir/Simpson Hurricane Scale (SSHS) around 0330 UTC 27 August.

The hurricane slowed down and weakened while moving over eastern North Carolina. It was then downgraded to tropical storm status based on surface observations and WSR88-D winds. Bonnie turned northeastward over water ahead of a middle-level trough and rapidly regained hurricane strength as indicated by aircraft reconnaissance data. Thereafter, the hurricane moved on a general northeast to east track and became extratropical near 1800 UTC 30 August, about 240 n mi south southeast of New Foundland.

Bonnie's track is shown in Fig. 1 (50K GIF). Table 1 is a listing, at six-hourly intervals, of the best-track position, estimated minimum central pressure and maximum 1-minute surface wind speed.

b. Meteorological Statistics

The best track pressure and wind curves as a function of time are shown in Figs. 2 (25K GIF) and 3 (20K GIF) and are primarily based on data from numerous reconnaissance flights into the hurricane. The best track also incorporates WSR-88D data, surface observations and GPS sondes in the eyewall of the hurricane. The routine satellite intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the Air Force Weather Agency, (AFGWC in figures) were also included. The Hurricane Bonnie event was characterized by a high density of observations. During Bonnie, the NOAA high altitude jet and P-3 deployed a very large number of sondes over a large portion of the Atlantic as a part of a major synoptic flow experiment. These observations were primarily used to initialize the numerical models.

The maximum winds measured were 116 knots at the 700-mb level at 0113 UTC 25 August and then again at 1659 UTC 26 August. These measurements were taken during the AF963 and the NOAA 43 reconnaissance missions, respectively. Table 2 displays selected surface observations during Bonnie, primarily over the area where the hurricane made landfall. There were several important and useful observations relayed to the NHC and to the local NWS forecast offices from amateur observing reports. These include reports of peak winds of 104 knots at 0138 UTC near NC State Port and 100 knots at Wrightsville Beach at 1951 UTC 27 August. Rainfall totals of about 8 to 11 inches were recorded in portions of eastern NC.

Storm tides of 5 to 8 feet above normal were reported mainly in eastern beaches of Brunswick County NC, while a storm surge of 6 feet was reported at Pasquotank and Camdem counties in the Albemarle Sound.

A tornado was reported in the town of Edenton NC in Chowan County.

c. Casualty and Damage Statistics

Three people died as a consequence of Bonnie. A 12-year old girl was killed when a large tree fell on her home in Currituck County, NC. Another person was caught in rip currents and drowned in Rehoboth Beach, Delaware. The third person died in Cape Cod in a rowboat accident when choppy seas overturned the boat. The last one may have been indirectly related to Bonnie.

There are numerous reports of many trees down, roof and structural damage and widespread power outages primarily in eastern North Carolina and Virginia where a federal disaster was declared for several counties. The area hardest hit appears to have been Hampton Roads, Virginia, where the damage could reach well into the hundreds of millions of dollars.

The Property Claim Services Division of the American Insurance Services Group reports that Bonnie caused an estimated $ 360 million in insured property damage to the United States. This estimate includes $ 240 million in North Carolina, $ 95 million in Georgia, and $ 25 million in South Carolina. A conservative ratio between total damage and insured property damage, compared to past landfalling hurricanes, is two to one. Therefore, the total U.S. damage estimate is $ 720 million.

d. Forecast and Warning Critique

Figure 4 (26K GIF) shows a sequence of numerical guidance forecast track for 1800 UTC on 22, 23 and 24 August. Note that on the 22nd, most of the models suggested that Bonnie was going to remain out to sea. Thereafter, during the 23rd and 24th, there was a significant change in the model forecasts and some of them turned the hurricane toward the west while others kept it out to sea. At that point, the forecast became very difficult and highly uncertain. Consequently, watches and warnings were required for a large portion of the southeast U.S. coast (Table 3). In spite of the model's scatter, the official forecast tracks remained basically unchanged and in the middle of the model forecast ensemble. Apparently, during the earlier runs, the models weakened the ridge to the north of the hurricane too soon and forecast a premature recurvature.

Table 4 lists track forecast error statistics. The official forecast errors for Bonnie were in general very close to the most recent 10-year average. There was only a small improvement in the 48 and 72 hour forecast if compared to the average.

With the exception of a few 72-h forecast errors at the beginning of Bonnie's life, the NHC intensity forecasts for Bonnie were smaller than the past 10-year average errors.

Table 1. Best track, Hurricane Bonnie, 19- 30 August, 1998

Date/Time (UTC)	Position		Pressure (mb)	Wind Speed (kt)	Stage
	Lat. (° N)	Lon. (° W)			
19/1200	14.7	48.1	1009	25	tropical depression
1800	15.4	50.1	1009	30	"
20/0000	16.2	52.2	1009	30	"
0600	16.9	54.7	1008	30	"

22/0000	21.1	67.3	991	65	hurricane
0600	21.8	68.7	989	70	"
1200	22.3	69.8	980	75	"
1800	23.0	70.5	970	85	"
23/0000	23.4	71.0	962	90	"
0600	23.8	71.3	960	95	"
1200	24.1	71.5	958	100	"
1800	24.4	71.7	955	100	"
24/0000	24.8	71.8	954	100	"
0600	25.2	72.1	960	100	"
1200	25.6	72.4	962	100	"
1800	26.1	72.8	963	100	"
25/0000	26.9	73.2	963	100	"
0600	27.8	73.8	962	100	"
1200	28.8	74.7	963	100	"
1800	29.8	75.6	963	100	"
26/0000	30.8	76.4	958	100	"
0600	31.7	77.3	964	100	"
1200	32.7	77.8	965	100	"
1800	33.4	77.8	962	100	"
27/0000	34.0	77.7	963	95	"
0600	34.5	77.5	965	85	"
1200	34.9	77.1	974	75	"
28/0000	35.8	75.9	983	65	hurricane
0600	36.2	75.1	985	75	"
1200	36.7	74.3	990	65	"
1800	44.0	50.0	998	45	extratropical
31/0000	44.0	45.0	996	45	"
0600	43.0	41.0			absorbed by a front
24/0000	24.8	71.8	954	100	**minimum pressure**
27/0400	34.4	77.7	964	95	**Landfall near Wilmington NC**

Table 2. Hurricane Bonnie selected surface observations, August 1998.

	Minimum sea-level pressure		Maximum surface wind speed (kt)					
Location	**Pressure (mb)**	**Date/time (UTC)**	**Sustained wind (kts) [a]**	**Peak gust (kts)**	**Date/time[b] (UTC)**	**Storm surge[c] (ft)**	**Storm tide[d] (ft)**	**Rain (storm total) (in)**
U.S.Virgin Islands								
St. Thomas Airport	1006.1	21/1128	23	33	21/0851			0.29
Puerto Rico								
Ceiba	1006.8	21/1121	24	33	21/0156			0.51
Carolina								1.10
Grand Turk Island								3.50
South Carolina								
Charleston International Airport	1007.0	26/1856	25	33	26/2034			
Charleston City Office			25		26/1230			
Myrtle Beach (MYR)					26/1715			
North Carolina								
Wilmington	969.9	27/0053		64	26/1827			9.04
Kure Beach				77	26/1630			
Florence Air.					26/2150			
Elizabeth City	995.7	28/0030			28/0333			1.42
Ocracoke	990.5	27/1815		66	27/1457			6.60
Oregon Inlet	989.1				27/2015			
Emerald Isle	976.9							
Newport	985.1	27/1030			27/0553			9.51
Greenville					27/0915			8.20
Morehead City								10.70
Cherry Point					27/0114			10.93
Jacksonville					27/1133			11.00
Frisco				69	27/1109			
New Hanover							7-9	
Tide Gage on Masonboro Isl.							9.1	
Wrightsville Beach							7- 7.3	
Virginia								
Cape Henry			70	90	28/0300			
Chesapeake Light Stn. Brookley Field			68	81	28/0350			
Currituck County EOC				81	28/0400			
Oceana NAS	999.0				28/0357			
Langley AFB	1005.0				27/2355			
Norfolk Airport (ORF)	1000.4	28/0024			28/0141			6.77
Porthmouth	1000.0	28/0105			28/0222			2.44

Norfolk NAS	1002.0				27/2315			4.91
Sewells Point							6.0	
Coastal Pasquotank						6.0		
Chowan County						5-6		
New Jersey/Delaware								
Delaware Light Buoy	1005.2	28/1800	32		28/1700			
Reedy Point							6.28	
Cape May							6.05	
Atlantic City							4.97	
Sandy Hook							5.64	
Georges Bank Buoy	990.2	29/1600			29/1700			
CMAN Stations								
Frying Pan Shoals (FPSN7)	964.0	26/1630	76[f]	90	26/2130			
Cape Lookout (CLKN7)	994.2	27/1300		75	27/1211			
Diamond Shoals (DSLN7)	996.8	27/2200	68	79	27/2034			
Duck NC (DUCN7)	993.5	28/0100			27/2000			
Cheasepeake Lt. (CHLV7)	995.7	28/0600	72[f]	86	28/0532			
Buoys								
41002	998.7	26/0300			26/0426			
41004	990.5	26/1300			26/1600			
44004	994.3	29/0600			29/0131			
44014	989.8	28/1000			28/0200			
44137	998.2	30/0000			30/0300			
44144	990.8	30/0300			30/0300			

[1] Standard NWS ASOS and C-MAN maveraging period is 2 min; buoys are 8 min unless otherwise indicated.

[2] Date/time is for sustained wind when both sustained and gust are listed.

Storm surge is water height above normal astronomical tide level.

[4] Storm tide is water height above NGVD.

[5] Estimated.

10 min average wind.

Table 3. Tropical Cyclone watch and warning summary for Hurricane Bonnie.

Date/time (UTC)	Action	Location
20/0300	Tropical Storm Watch issued	Antigua, Barbuda, Anguilla, St. Maarten, Saba and St. Eustatius
20/1500	Tropical Storm Watch issued	U.S. and British Virgin Islands
20/2100		U.S. and British Virgin Islands
	Tropical Storm Watch issued	Puerto Rico

21/0900	Tropical Storm Watch issued	Turk and Caicos and the southeastern Bahamas
21/1200	Tropical Storm Watch discontinued	Antigua, Barbuda, Anguilla, St. Maarten, Saba and St. Eustatius
21/1500	and a Hurricane Watch	Turk and Caicos and southeastern Bahamas
	Hurricane Watch issued	Central Bahamas
	Tropical Storm Warning discontinued	U.S. and British Virgin Islands
	Tropical Storm Watch discontinued	Puerto Rico
22/0900	Hurricane Warning issued	Central Bahamas
22/1500	Hurricane Watch issued	Northwestern Bahamas
23/0000	Hurricane Warning discontinued	Turks and Caicos
	Hurricane Warning replaced by Tropical Storm Warning	Southeastern Bahamas
24/0900	Tropical Storm Warning discontinued	Southeastern Bahamas
24/2100	Hurricane Watch issued	Savannah, Georgia to the North Carolina/Virginia border including the Pamlico and Albemarle Sounds
25/0900	Hurricane Warning issued	from Murrells Inlet, S.C. to the north Carolina Virginia border, including the Palmico and Albemarle Sounds
25/1200	Hurricane Watch issued	from North Carolina/Virginia border to Cape Henlopen, Delaware including the Chesapeake Bay southward from Windmill point.
25/1500	Tropical Storm Warning issued	from Murrels inlet to Cape Romain, S.C.
25/1800	Hurricane Warning extended northward	to Chincoteague, VA
25/2100	Hurricane Warning extended southward	to Cape Romain, S.C.
26/0600	Hurricane Warning extended southward	to Edisto Beach, S.C.
26/1500	Hurricane Warning and Watches discontinued	south of Cape Romain
26/2100	Hurricane Warnings and Watches revised. Tropical Storm Warning and Hurricane Watch issued	from North Carolina/Virginia border to Chincoteague, Virginia and for the Chesapeake Bay from Smith Point southward
	Tropical Storm Watch issued	from Chincoteague, Virginia to Cape Henlopen, Delaware
27/0100	Hurricane warning replaced by Tropical Storm Warning	south of Murrels Inlet to Cape Romain
27/0900	Hurricane Warning replaced by Tropical Storm Warning	south of Little River Inlet, NC to Murrels Inlet, SC
	Tropical Storm Watch issued	from north of Cape Henlopen to Sandy Hook, NJ including Delaware Bay
	Tropical Storm Warning discontinued	from south of Murrels Inlet
27/1500	Tropical Storm Warning issued	from new River Inlet, NC to Cape Henlopen, DE including Palmico and Albemarle Sounds and Chesapeake Bay southward from Smith Point
	Tropical Storm Watch issued	Chesapeake bay from Smith Point to Drum Point and for the Potomac River from Cobb Point to Smith Point
27/2100	Tropical Storm Warning issued	from New River Inlet NC to Watch Hill, RI including Palmico and Albemarle Sounds, Chesapeake Bay southward from Smith Point and Delaware Bay
	Tropical Storm Watch issued	from east of Watch Hill, RI to Plymouth, MA
28/0300	Tropical Storm Warning discontinued	south of Cape Lookout, NC
28/0900	Tropical Storm Watch discontinued	from Watch Hill to Plymouth
	Tropical Storm Warning discontinued	south of Ocracoke, NC and for the Chesapeake Bay and Potomac River north of Smith Point
28/1500	Tropical Storm Warning discontinued	south of NC/VA border including Pamlico and Albemarle Sounds and for Chesapeake and

		Delaware Bays
28/2100	Tropical Storm Warning discontinued	south of Watch Hill including Delaware Bay and Long Island Sound
29/0300	Tropical Storm Warning discontinued	remainder of the U.S. East coast

opical Cyclone watches and warnings are issued by respectively countries in coordination with the National ricane Center.

Table 4. Preliminary forecast evaluation of Hurricane Bonnie. Heterogeneous sample. (Errors in nautical miles for tropical storm and hurricane stages with number of forecasts in parenthesis)

Forecast Technique	Period (hours)				
	12	24	36	48	72
CLIP	60 (41)	127 (40)	196 (38)	258 (36)	318 (32)
GFDI	47 (39)	86 (38)	136 (37)	203 (36)	397 (32)
GFDL*	43 (34)	79 (34)	116 (33)	180 (33)	348 (31)
LBAR	44 (41)	89 (40)	137 (38)	213 (36)	393 (32)
AVNI	46 (41)	89 (40)	140 (37)	214 (37)	468 (30)
BAMD	40 (41)	66 (40)	87 (38)	137 (36)	183 (32)
BAMM	40 (41)	81 (40)	112 (38)	142 (36)	242 (32)
BAMS	69 (41)	124 (40)	162 (38)	194 (36)	327 (32)
NGPI	42 (34)	78 (33)	117 (31)	157 (29)	226 (25)
UKMI	46 (40)	78 (39)	117 (31)	143 (35)	214 (31)
NHC OFFICIAL	45 (41)	86 (39)	129 (37)	172 (36)	232 (32)
NHC OFFICIAL (1988-1997)	47 (1838)	88 (1633)	127 (1449)	165 (1284)	248 (1006)

Preliminary Report
Hurricane Dennis
24 August - 7 September 1999

Jack Beven
National Hurricane Center
11 January 2000

Text-only version
(printer friendly)

PRELIMINARY REPORTS
Tropical Storm Arlene
Tropical Depression Two
Hurricane Bret
Hurricane Cindy
Hurricane Dennis
Tropical Storm Emily
Tropical Depression Seven
Hurricane Floyd
Hurricane Gert
Tropical Storm Harvey
Tropical Depression Eleven
Tropical Depression Twelve
Hurricane Irene
Hurricane Jose
Tropical Storm Katrina
Hurricane Lenny

Dennis was a larger-than-average western Atlantic hurricane that was erratic in both track and intensity. Although it never made landfall as a hurricane, it affected the North Carolina coast with hurricane force winds, heavy rains, prolonged high surf, and beach erosion. Dennis also produced tropical storm force winds over portions of the Bahamas.

a. Synoptic History

The origin of Dennis can be traced to a tropical wave that moved off the coast of Africa on 17 August. The system moved westward with little significant weather until 21 August, when associated shower activity increased a few hundred miles northeast of the Leeward Islands. A low- level circulation developed over the next two days as convective organization increased. An investigative flight by the Air Force Reserve Hurricane Hunters failed to find a surface circulation on the 23rd. However, the aircraft data indicated a circulation was present at 850 mb. Later surface observations showed a closed circulation, and it is estimated that Tropical Depression Five formed at 0000 UTC 24 August about 190 n mi east of Turks Island (Table 1 and Figure 1). Reconnaissance data and ship reports indicated further intensification, and the depression became Tropical Storm Dennis at 1200 UTC the same day.

The initial structure was unusual. Dennis was at the east-southeast end of an elongated trough that extended to southern Florida. This and upper-level westerly shear caused an asymmetric pattern of convection and tropical storm force winds, with both confined to the eastern semicircle on 24-25 August. Despite the shear, the cyclone intensified unsteadily and reached hurricane strength early on the 26th.

The unusual structure may have also affected the cyclone's motion. Dennis initially moved at 9 to 12 kt, but slowed to an erratic 3 kt on 25 August as steering currents weakened due to a mid-latitude trough passing to the north. At one time that day, the center appeared to re-form eastward along the trough axis. Once Dennis reached hurricane strength, it began a more steady northwestward motion near or over the eastern Bahamas. This motion continued into the 28th.

Westerly shear persisted, preventing significant strengthening until late on 27 August. After the shear decreased, Dennis reached a peak intensity of 90 kt on the 28th and maintained that intensity until early on the 30th. Even at peak intensity, Dennis never consolidated into a classic tightly-wound hurricane. The eye was 30 to 40 miles wide, and on several center fixes the Hurricane Hunters did not report an eye. The radius of maximum winds was as large as 70 to 85 nm on the 29th and 30th.

A second mid-latitude trough caused Dennis to turn gradually northward on 28-29 August, which was followed by acceleration to the east-northeast on 30th and 31th. This turn kept the center about 60 miles south of the North Carolina coast. The east-northeast motion continued until the trough passed Dennis on the 31st. At that time, steering current collapsed and the cyclone slowed to an erratic drift about 110 n mi east of Cape Hatteras, NC. The erratic motion would last into 2 September.

During this time, Dennis became involved with the cold front associated with the mid-latitude trough. A combination of vertical shear and cool dry air entraining into the circulation decreased the convection and weakened the cyclone. Dennis weakened to a tropical storm on 1 September, and on the 1st and 2nd may have been as much a subtropical or extratropical cyclone as a tropical cyclone. Despite the lack of convection, surface observations indicate maximum sustained winds were near 45 kt during 2 September. Some of these winds were due to the combination of Dennis and a strong surface ridge north of the front, which caused 34 kt or greater winds as far north as the New Jersey coast.

A large westerly ridge over the eastern United States forced Dennis southward late on 2 September. This motion toward warmer water probably aided a deep convective burst on the next day. Later that day, Dennis turned northwest toward the North Carolina coast as the ridge moved east into the Atlantic. This motion continued on the 4th along with re-intensification. Dennis was just below hurricane strength when it made landfall over the Cape Lookout National Seashore just east of Harkers Island, NC at 2100 UTC that day. Dennis continued inland and weakened to a depression on the 5th over central North Carolina. Even in dissipation, Dennis continued to move erratically. Figure 1 shows that the cyclone followed a zig-zag course northward for the rest of its life. Dennis became extratropical on the 7th and was absorbed into a larger low on the 9th.

b. Meteorological Statistics

Table 1 shows the best track positions and intensities for Dennis, with the track plotted in Figure 1. Figure 2 and Figure 3 depict the curves of minimum central sea-level pressure and maximum sustained one-minute average "surface" (10 m above ground level) winds, respectively, as a function of time. These figures also contain the data on which the curves are based: aircraft reconnaissance and dropsonde data from the Air Force Reserve Hurricane Hunter and NOAA, satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Synoptic Analysis Branch (SAB) of the National Environmental Satellite Data and Information Service (NESDIS), and the Air Force Weather Agency, and estimates from synoptic data.

1. Wind and Pressure Data

The Hurricane Hunters flew 24 missions into Dennis and made 81 center fixes, and NOAA research aircraft provided three additional fixes during various research missions. The maximum reported wind was 110 kt (at 700 mb) at 2002 UTC 28 August. While taking 90% of this wind would suggest a maximum sustained surface wind of 99 kt, dropsonde observations at that time do not support that high of a surface wind. The minimum observed central pressure observed from dropsondes was 962 mb at 0350 and 0543 UTC on 30 August. A 959 mb pressure was estimated from 700 mb data at 1017 UTC on the 30th, (Figure 2), but is believed to be too low. The Hurricane Hunters also measured 71 kt winds (at 850 mb) and a 984 mb pressure just before Dennis made landfall on 4 September. These data indicate Dennis was a 60 kt tropical storm at landfall.

Dennis's path brought it near the eastern Bahamas on 27-28 August. The only official report of tropical storm force winds in the Bahamas was from the Coastal Marine Automated Network (C-MAN) station at Settlement Point, Grand Bahama, which reported 34 kt sustained winds with gusts to 46 kt at 0030 UTC 29 August. (This and other available surface observations are summarized in Table 2.) However, reports relayed to the NHC through amateur radio operators indicated sustained winds of up to 60 to 65 mph with gusts of 70 to 75 mph in the Abaco island group. Reported pressures were as low as 976 mb as the western part of the eye passed over the Abacos around 0700 to 1000 UTC on the 28th. While these observations are significant, their reliability is uncertain. Therefore, they are not included in Table 2.

Dennis tracked parallel to the Florida and Georgia coasts, with tropical storm force winds remaining mostly offshore. The only reported tropical storm force wind was a 41 kt gust at the St. Augustine, FL C-MAN station. The core of Dennis passed just east of NOAA buoy 41010 on 29 August, which reported 57 kt sustained winds with gusts to 72 kt at 0500 UTC and a minimum pressure of 980.2 mb at 0750 UTC.

Dennis's first pass near the coast of the Carolinas on 30 August caused

sustained tropical storm force winds with gusts to hurricane force in coastal North Carolina and gusts to tropical storm force in coastal South Carolina from Charleston northward. The maximum reported sustained winds were 53 kt with gusts to 77 kt at Oregon Inlet at 2030 UTC. It is not clear whether sustained hurricane force winds affected the coast. There are no observations of such winds, and analyses from the Hurricane Research Division suggests they stayed offshore. However, gusts to 96 kt at Wrightsville Beach and 85 kt at Hatteras Village (Table 2) suggest that sustained hurricane force winds may have occurred along the coasts of New Hanover and Dare counties. Sustained hurricane force winds of 81 kt with gusts to 97 kt were measured at the Frying Pan Shoals C-MAN station (145 ft elevation) at 0945 UTC 30 August, with a minimum pressure of 977.2 mb at 0900 UTC.

The landfall of Dennis on 4 September produced tropical storm force winds over portions of eastern North Carolina and coastal southeastern Virginia. Langley Air Force Base VA, reported 45 kt sustained winds with gusts to 66 kt at 2330 UTC, while Cherry Point Marine Corp Air Station NC, reported 41 kt sustained winds with gusts to 53 kt at 2005 UTC.

The large circulation of Dennis also affected shipping over a portion of the western Atlantic. Table 2a shows the available ship observations of tropical storm force or greater winds. The maximum ship-observed winds were 65 kt from the **Zim U.S.A.** at 0900 UTC 30 August, while the lowest observed pressure was 987.3 mb from the **Hoegh Dene** at 1800 UTC 4 September. Observations from the **Sealand Crusader** on 24 August were important in determining that the pre-Dennis wave had developed into a depression.

2. Storm Surge Data

Few detailed observations of storm surge are available from areas affected by Dennis (Table 2). Storm tides of 3 to 5 ft above normal were reported along much of the North Carolina coast on both 30 August and 4 September. Areas along the Neuse River reported tides of 8 to 10 ft above normal tide level on 30 August, while areas along the Pamlico River reported similar values on 4 September. Portions of the South Carolina and southeastern Virginia coast experienced 2 to 4 ft above normal tides during Dennis, while amateur radio reports from the Bahamas indicate tides 1 to 3 ft above normal as the eye passed over the Abacos.

Since Dennis meandered off the North Carolina coast for several days, the above normal tides were unusually prolonged. This led to extensive beach erosion along portions of the North Carolina and southeastern Virginia coasts.

3. Rainfall data

Dennis affected the mid-Atlantic states twice within a week, and other weather systems affected the region during the same period. This makes determination of storm total rainfall in that area difficult. Table 2 shows the storm total rainfalls for Dennis, including the best estimates in North Carolina and Virginia. The maximum reported total was 19.13 inches at Ocracoke NC, with 6 to 10 inches reported elsewhere over portions of eastern North Carolina. Rainfalls of 3 to 6 inches occurred elsewhere over eastern North Carolina, extreme eastern South Carolina, and over portions of southeastern Virginia. Rainfalls were generally 1 to 3 inches elsewhere over eastern South Carolina and less than an inch in Florida and Georgia.

Dennis and the other weather systems contributed to a wet period over portions of the mid-Atlantic states. Table 2b shows 11-day rainfall totals of 6 inches or more ending at 1200 UTC 8 September. The heaviest rainfalls were observed over eastern North Carolina and central Virginia. While this rainfall broke a prolonged dry spell in the area, it also set the stage for the severe flooding caused by Hurricane Floyd two weeks later.

Official rainfall data from the Bahamas indicates a maximum total of 4.00 inches at Cat Island. Heavier amounts likely occurred on Eleuthera and in the Abaco group near the eye of Dennis.

4. Tornadoes

One tornado was reported with Dennis on 4 September. This F2 tornado in

Hampton VA caused an estimated $7 million damage and 15 injuries, 6 of them serious.

c. Casualty and Damage Statistics

Four deaths reported in Florida were related to high surf spawned by the hurricane. No deaths are known due to winds, rains, storm tides or tornadoes associated with Dennis.

In the United States, the Property Claims Services Division of the Insurance Services Office reports insured losses due to Dennis totaled $60 million in North Carolina and Virginia. To determine the total property damage, a two to one ratio is applied to the insured property damage based on comparisons done in historical hurricanes. Press reports indicate that agricultural losses in North Carolina and Virginia were $37 million. Combining these reports gives a total estimated damage from Dennis of $157 million.

There are no damage reports available from the Bahamas as of this time.

d. Forecast and warning critique

Table 3 shows the track forecast errors during Dennis for the official NHC track forecast and a selection of objective guidance models. The official forecasts were generally quite good with errors of about 60% to 70% of the long term average. The official forecasts also were better than the objective guidance with two exceptions: The United Kingdom Meteorological Office global model (UKM) was slightly better than the official forecast at all time periods, and the barotropic model LBAR was slightly better at 12 and 24 hours. It should the noted that the UKMI, which is the interpolated UKM track forecast available to hurricane forecasters in real time, was slightly worse than the official forecast at all time periods. There were two periods with worse than average official track forecasts. The first was on 24 August, as the poorly-organized Dennis consistently moved slower than forecast. The second on was 28 August, when the motion parallel to the coast on 30-31 August was poorly forecast.

While intensity forecast errors were also better than the long term average, there was a significant positive bias which is counter to the 10-year average. This occurred due to forecasts on 28-30 August which predicted Dennis to remain a hurricane when it actually weakened to a tropical storm. Three consecutive forecasts during this time overforecasted the 72 hour intensity by 50 kt.

Table 4 shows the watches and warnings that were issued for Dennis. Due to the somewhat erratic motion near the Bahamas, hurricane warnings were issued for Eleuthera and the Abacos 40 hours before the eye passed over the Abacos. While tropical-storm force winds did not occur over land south of Charleston, SC, they were present over the Florida, Georgia, and South Carolina coastal waters. Hurricane warnings for the North Carolina coast on 29 August had less than the normally-desired 24 hour lead time. However, these were issued in anticipation that Dennis' large size and track just offshore would cause hurricane conditions along the coast and not in anticipation of a landfall. Hurricane warnings were also issued for the North Carolina coast on 4 September in anticipation of Dennis regaining hurricane strength before landfall. These proved to be unnecessary.

Acknowledgments:

Much of the data in this report was provided by the local National Weather Service forecast offices in Miami, Melbourne, Jacksonville, Charleston, Wilmington, Morehead City, and Wakefield. Buoy and C-MAN station data was provided by the National Data Buoy Center. James Franklin created the wind and pressure plots.

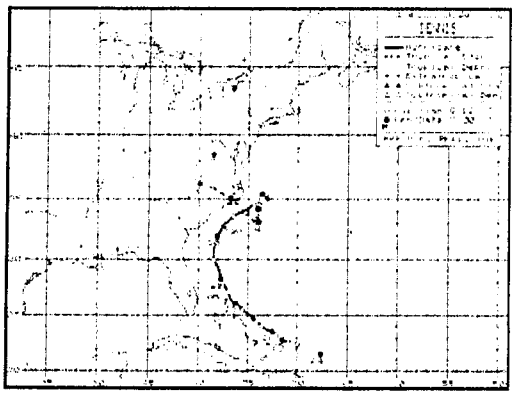


Figure 1. Best track for Hurricane Dennis, 24 August - 7 September 1999.

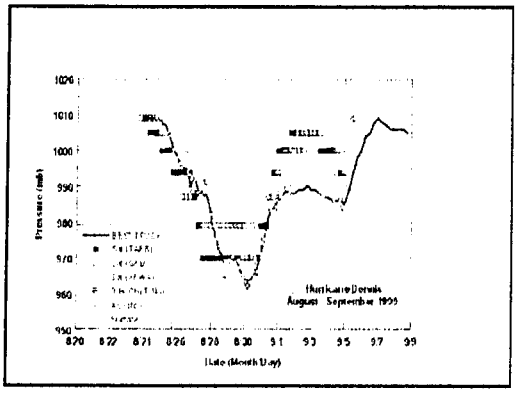


Figure 2. Best track minimum central pressure curve for Hurricane Dennis, 24 August - 7 September 1999.

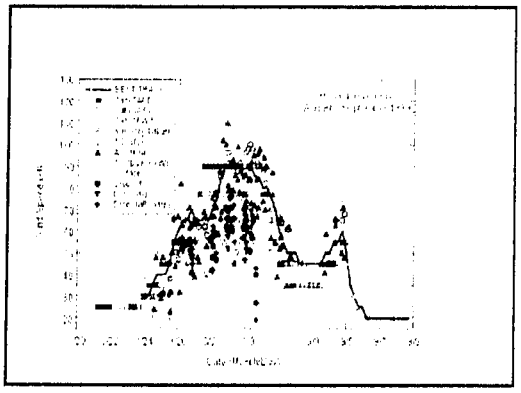


Figure 3. Best track maximum sustained 1-minute 10 meter wind speed curve for Hurricane Dennis, 24 August - 7 September, 1999.

Table 1. Best track, Hurricane Dennis, 24 August - 7 September 1999

Date/Time (UTC)	Position		Pressure (mb)	Wind Speed (kt)	Stage
	Lat. (°N)	Lon. (°W)			
24/0000	21.5	67.7	1009	30	tropical depression
24/0600	22.0	68.9	1009	30	"
24/1200	22.4	70.0	1009	35	tropical storm
24/1800	22.7	70.9	1009	40	"
25/0000	22.8	71.5	1008	40	"
25/0600	23.0	71.9	1007	40	"
25/1200	23.2	72.1	1004	45	"
25/1800	23.4	72.3	1000	55	"
26/0000	23.6	72.5	998	60	"

26/0600	23.8	73.1	995	65	hurricane
26/1200	24.1	73.6	995	65	"
26/1800	24.4	74.0	990	70	"
27/0000	24.8	74.4	993	65	"
27/0600	25.2	75.0	988	65	"
27/1200	25.6	75.5	988	65	"
27/1800	25.9	75.9	987	65	"
28/0000	26.1	76.2	982	70	"
28/0600	26.5	76.7	976	75	"
28/1200	27.1	77.0	973	85	"
28/1800	27.7	77.3	969	90	"
29/0000	28.3	77.7	969	90	"
29/0600	29.0	77.9	970	90	"
29/1200	29.9	78.4	971	90	"
29/1800	30.8	78.4	967	90	"
30/0000	31.9	78.1	964	90	"
30/0600	32.8	77.6	962	90	"
30/1200	33.6	76.5	965	85	"
30/1800	34.3	74.8	966	85	"
31/0000	34.9	73.6	971	80	"
31/0600	35.1	72.9	977	80	"
31/1200	35.2	72.8	983	75	"
31/1800	35.1	73.3	984	70	"
01/0000	35.2	73.6	986	60	tropical storm
01/0600	35.0	73.4	987	55	"
01/1200	35.4	73.5	989	50	"
01/1800	35.5	73.8	988	50	"
02/0000	35.4	73.7	988	50	"
02/0600	35.2	73.6	989	45	"
02/1200	35.1	73.7	989	45	"
02/1800	34.8	73.9	990	45	"
03/0000	34.2	74.0	989	45	"
03/0600	33.6	74.1	989	45	"
03/1200	33.2	73.9	988	45	"
03/1800	33.0	73.8	987	50	"
04/0000	33.1	74.0	987	50	"
04/0600	33.3	74.5	986	55	"
04/1200	33.9	75.3	986	55	"
04/1800	34.5	76.0	986	60	"
05/0000	35.0	76.8	985	50	"
05/0600	35.5	77.7	989	35	"
05/1200	36.1	78.8	994	30	tropical depression
05/1800	36.2	79.4	998	25	"
06/0000	36.2	79.9	1000	25	"
06/0600	36.4	80.1	1004	20	"
06/1200	37.0	79.9	1005	20	"
06/1800	37.7	79.5	1008	20	"
07/0000	38.5	78.5	1009	20	"
07/0600	40.8	77.0	1008	20	"
07/1200	42.7	77.7	1007	20	"
07/1800	43.5	77.7	1006	20	extratropical
08/0000	43.5	76.5	1006	20	"
08/0600	44.0	75.8	1006	20	"
08/1200	44.9	74.8	1006	20	"
08/1800	45.5	75.6	1005	20	"
09/0000					lost identity

30 /0600	32.8	77.6	962	90	**minimum pressure**
Landfalls:					
28/0700	26.6	76.8	976	75	Abaco Islands, Bahamas
04/2100	34.8	76.5	984	60	Cape Lookout National Seashore, NC

Table 2. Hurricane Dennis selected surface observations, 24 August - 7 September 1999. (Incomplete pending further data from NDBC)

	Minimum sea-level pressure		Maximum surface wind speed (kt)					
Location	**Pressure (mb)**	**Date/time (UTC)**	**Sustained wind (kts) [a]**	**Peak gust (kts)**	**Date/time[b] (UTC)**	**Storm surge[c] (ft)**	**Storm tide[d] (ft)**	**Rain (storm total) (in)**
Bahamas								
Cat Island								4.00
North Carolina								
Alligator Bridge[#]			48	56	30/1100			
Atlantic (Texas Tech tower, 30 ft)	992.6	30/1351	48	75	30/1532			
Beaufort	984.8	04/2049	33	45	04/1823			
Beaufort (Texas Tech tower, 33 ft)	992.8	30/1302	52	75	30/1103			
Blockade Runner				72				
Brunswick Cnty Airport				61	30/0810			
Brunswick Power Plant			50[g]		30/0456			
Calabash				35				1.57
Carolina Beach				66	30/0710			
Castle Hayne (Oxychem)				54	30/1100			
Castle Hayne (SW)			35	67	30/0900			
Cherry Point MCAS	986.5	04/2355	41	53	04/2005			9.24
Delco			28	57	30/1200			
East Waccamaw				34	30/1100			0.98
Elizabeth City	1003.8	04/2313	34	45	30/1654			7.01
Elizabethtown				37				
Flemington			39	68	30/0900			
Greenville				43	05/0140			
Harkers Island Bridge				76	30/1230			
Hatteras Inlet			50[$]	64	30/1930			
Hatteras Village				85	30/1515			
Jacksonville	994.2	05/0235		41	30/0835			
Kingston				37	04/2250			
Kure Beach				58	30/0740			
Kure Beach (Federal Point)				71	30/0530			
Manteo				52	30/1635			
New Bern	986.8	05/0000	35	46	30/1056			3.35
New River	993.9	04/2126	33	50	30/0956			5.75

Newport	985.1	04/2115		54	30/1204			9.89
North Topsail Beach			44$	65	30/1240			
Oak Island			46	62	30/0800			
Ocean Isle				49	30/0559			
Ocean Isle (Tubbs Inlet)				46	30/0753			
Ocracoke Island#	995.1	31/0740	35$	58	31/0220			19.13
Oregon Inlet			53$	77	30/2030			
Oriental							6-8	
St. James								6.00
Shallotte				60	30/0700			
Shallotte Inlet				60	30/0730			
Southport (Elementary)				49				9.01
Southport (Marina)								13.50
Southport (Pilot Boat Dispatch)				60	30/0743			
Washington				41	30/1520			
Whiteville				37				1.97
Wilmington Airport	996.1	0953	42	53	30/0607			4.73
Wilmington (Battleship North Carolina)				66	30/0530			6.70
Wilmington (College RD/Oleander DR)				46				8.75
Wilmington (Corning)				60	30/1200			
Wilmington (Eastwood RD/Military Cutoff)				44	30/0650			6.60
Wilmington (Masonboro Loop)				37				
Wilmington (New Hanover EOC)			51	76	30/0800			
Wilmington (WECT-TV)				46				5.07
Wrightsville Beach				96	30/0444			
Wrightsville Beach Fire Dept.				73	30/0630			
South Carolina								
Charleston Harbor							2.0	
Charleston WFO			29	40	29/2050			1.22
Murrells Inlet								2.88
Myrtle Beach (Pavilion)				45	30/0600			
N. Myrtle Beach			29	42	30/0732			1.65
Virginia								
John Kerr Dam								3.38
Norfolk Airport	1006.1	05/0551	37	46	30/1651			3.30
Langely AFB	1007.1		45	66	04/2332			
Newport News	1006.5		28	39	04/2332			3.32
Norfolk NAS	1006.5							2.85

Oceana NAS	1006.5							2.90
Portsmouth								5.75
Richmond	1006.5	05/0754						2.18
Roanoke Rapids			27	35	30/1214			
Sewells Point							3.0	
Wakefield								4.59
Wallops Island			33	40	30/1717			
NOAA Buoys and C-MAN Stations								
Buoy 41001	976.0	31/0400	48[$]	63	30/2300			
Buoy 41002	997.6	30/1100	43[$]	59				
Buoy 41004	990.5	30/0300	54[$]	72	30/0330			
Buoy 41008	1003.9	29/2000	31	43	29/1700			
Buoy 41009[#]	1001.3	29/0900	29	37	29/0700			
Buoy 41010	980.2	29/0750	57	72	29/0500			
Buoy 44014	1002.3	30/2000	43	53	30/2100			
Drifting Buoy 41650[#]	1009.8	27/0000	45		27/1200			
Drifting Buoy 41651[#]	1010.8	25/2100	42		25/2100			
Cape Lookout NC (CKLN7)	986.5	04/2000	60	79	30/1400			
Chesapeake Bay VA (CHLV2)	1006.2	05/0600	49[$]	56	30/2100			
Duck NC (DUCN7)	1005.6	04/2300	56	65	30/2000			
Folly Beach SC (FBIS1)	1001.6	30/0100	24	35	30/0000			
Frying Pan Shoals NC (FPSN7)	977.2	30/0900	81[$]	97	30/0945			
Settlement Point, BI (SPGF1)	1002.6	28/2200	34[$]	46	29/0030			
St. Augustine FL (SAUF1)	1004.9	29/1100	27	41	29/1355			

[a]Standard NWS ASOS and C-MAN averaging period is 2 minutes; buoys are 8 minutes.
[b]Date/time is for sustained wind when both sustained and gust are listed.
[c]Storm surge is water height above normal astronomical tide level.
[d]Storm tide is water height above NGVD.
[e]Estimated.
[$]10 min average.
[g]100 ft tower, 15 min average.
[#]Incomplete record.

Table 2a. Ship observations of tropical storm or greater winds associated with Hurricane Dennis, 24 August - 7 September 1999.

Ship	Date/Time (UTC)	Lat. (°N)	Lon. (°W)	Wind dir/speed (deg/kt)	Pressure (mb)
Sealand Crusader	24/0600	21.0	67.0	130/35	1011.5
Iver Express	24/1800	23.2	74.6	010/39	1012.0
Jo Sypress	26/1500	25.9	73.0	120/39	1012.5
Nomzi	27/0000	25.9	74.3	090/44	1010.0
Nomzi	27/0300	25.9	74.0	090/45	1010.0
Nomzi	27/0600	26.0	73.7	070/40	1011.0
Star Hidra	28/2100	30.1	77.5	050/40	1005.0
Morelos	28/2100	26.2	74.4	170/34	1007.0
Torm Freya	29/0000	30.2	75.5	100/35	1005.0

Nedlloyd Holland	29/0000	27.8	79.2	340/42	1002.0
Star Hidra	29/0000	30.0	77.0	050/41	1004.0
Nedlloyd Holland	29/0300	28.7	79.9	340/39	1002.2
Star Hidra	29/0300	29.5	76.4	090/55	1001.0
Torm Freya	29/0600	29.5	74.8	150/48	1005.0
Star Hidra	29/0600	29.8	76.5	120/56	999.3
Star Hidra	29/0900	29.7	76.4	150/56	999.5
Star Hidra	29/1200	29.6	76.2	160/55	1000.5
Star Hidra	29/1500	29.3	76.1	180/46	1003.0
Torm Freya	29/1800	28.3	74.9	190/46	1007.0
Zim U.S.A.	29/2100	32.0	75.0	140/38	1006.0
Star Hidra	29/2100	28.8	77.1	210/37	1005.5
Zim U.S.A.	30/0000	32.0	75.1	160/40	1004.0
Zim U.S.A.	30/0300	32.0	75.3	160/50	1002.0
Zim U.S.A.	30/0600	31.8	75.5	180/65	999.0
OOCL Fair	30/0600	33.4	74.3	150/40	1005.0
Zim U.S.A.	30/0900	32.3	75.0	180/65	1000.0
OOCL Fair	30/0900	32.7	74.3	180/50	1002.0
Zim U.S.A.	30/1200	31.4	75.7	250/50	1002.5
SHIP	30/1200	36.9	75.0	040/40	1014.5
Zim U.S.A.	30/1500	31.5	76.3	270/50	1006.0
OOCL Fair	30/1500	32.1	74.6	210/50	1002.0
Inspiration	30/1800	35.8	71.9	080/50	1006.0
OOCL Fair	30/1800	32.0	75.0	260/55	1006.0
Inspiration	30/2100	35.6	72.6	090/55	1002.5
Barbet Arrow	31/1200	32.5	71.5	240/40	1009.2
Stonewall Jackson	31/1200	33.5	71.7	230/55	1003.5
SealandPerformance	31/1200	35.1	70.1	160/45	1005.0
Barbet Arrow	31/1800	32.4	72.3	250/40	1015.0
Edyth L.	31/1800	34.8	75.1	310/55	1005.7
Stonewall Jackson	31/1800	33.4	72.7	250/45	1007.0
Sealand Performance	31/1800	33.7	69.8	230/40	1009.5
Stonewall Jackson	02/0000	33.5	75.1	300/36	1010.0
Trojan Star	02/0000	36.8	70.7	110/38	1010.1
V2PE1	02/0600	33.9	72.2	220/40	1008.0
Shanghai Senator	02/0900	37.6	75.1	040/35	1011.0
V2PE1	02/1200	35.0	72.1	200/43	1005.2
OOCL Friendship	02/1800	34.1	74.7	300/45	999.2
V2PE1	02/1800	35.6	72.9	140/42	1004.5
OOCL Friendship	02/2100	34.1	73.5	200/45	993.6
V2PE1	03/0600	36.3	75.3	040/40	1010.5
Chemical Pioneer	03/1500	34.3	76.3	320/40	1004.7
Chemical Pioneer	03/1800	34.7	75.8	340/35	1004.7
Hoegh Dene	04/0600	33.1	77.3	100/39	1005.3
Hoegh Dene	04/1200	33.8	76.4	360/37	1000.0
Hoegh Dene	04/1500	34.1	76.0	110/39	992.5
Hoegh Dene	04/1800	34.4	75.6	150/40	987.3
Mette Maersk	04/1800	35.4	74.4	110/45	1002.9
Mette Maersk	04/2100	35.8	73.6	120/37	N/A
Hoegh Dene	05/0000	35.5	75.0	140/35	1003.8

Table 2b. Eleven day rainfall totals ending at 1200 UTC 8 September 1999. Data courtesy of the National Climatic Data Center

Station	Rainfall (in)	Station	Rainfall (in)
North Carolina			

Aurora	10.68	Greenville	7.66
Jacksonville	10.54	Edenton	7.33
Cherry Point	10.18	Wilsonville	7.11
Hatteras	9.30	Enfield	7.01
Apex	8.87	Kinston	6.80
Raleigh/Durham	8.46	Rougemount	6.69
Elizabeth City	8.17	Rocky Mount	6.53
Goldsboro (GSB)	8.04	Butner	6.50
Goldsboro	7.76	Arcola	6.34
Neuse	7.72	New Bern	6.09
Wilson	7.69	Oxford	6.07
Pennsylvania			
Lochiel	7.23	Elimsport	6.90
Williamsport	7.00	Loyalsockville	6.90
South Carolina			
Myrtle Beach	6.02		
Virginia			
Allisonia	13.82	Fincastle (DAEV2)	7.03
Buchanan	12.91	Mauretown	7.00
Front Royal (HOGV2)	12.86	Lovingston (LOVV2)	6.87
Roanoke (WITV2)	10.33	Front Royal (LIMV2)	6.76
Montebello	9.40	Lovingston (BRNV2)	6.68
Copper Hill (COPV2)	8.31	Strasburg	6.57
Fincastle (TIKV2)	7.63	Waynesboro	6.52
Copper Hill (COHV2)	7.62	Springcreek	6.50
Alberta	7.49	Roanoke (FOTV2)	6.44
Winterpock	7.33	South Boston	6.41
Algoma	7.11	Glasgow	6.28
Mathews	7.10	Pedlar Mills	6.20
Luray	7.09		

Table 3. Preliminary track forecast evaluation for Hurricane Dennis - heterogeneous sample. Errors in nautical miles for tropical storm and hurricane stages with number of forecasts in parentheses. Numbers in boldface represent forecast which were better than the official forecast.

Forecast Technique	Period (hours)				
	12	24	36	48	72
CLIP	44 (46)	92 (44)	150 (42)	209 (40)	360 (36)
GFDI	40 (38)	75 (36)	110 (34)	148 (32)	213 (29)
GFDL*	40 (36)	69 (34)	100 (32)	136 (30)	209 (27)
LBAR	**31** (46)	**61** (44)	99 (42)	137 (40)	217 (36)
AVNI	53 (42)	100 (40)	139 (38)	175 (35)	220 (26)
AVNO*	46 (40)	93 (37)	134 (35)	163 (32)	213 (22)
BAMD	35 (45)	65 (44)	102 (41)	144 (39)	212 (35)
BAMM	43 (46)	84 (44)	128 (42)	168 (40)	260 (36)
BAMS	56 (46)	111 (44)	169 (42)	230 (40)	343 (36)
NGPI	48 (44)	76 (42)	108 (40)	133 (38)	184 (30)
NGPS*	46 (23)	77 (22)	100 (21)	133 (20)	173 (16)
UKMI	41 (41)	68 (39)	96 (38)	118 (37)	161 (33)
UKM*	**33** (23)	**61** (22)	**82** (21)	**106** (20)	**147** (18)
A90E	39 (45)	73 (43)	100 (41)	138 (39)	228 (35)
A98E	38 (40)	73 (38)	110 (36)	151 (34)	240 (30)
A9UK	37 (22)	73 (21)	108 (20)	147 (19)	274 (17)
NHC Official	34 (46)	63 (44)	90 (42)	112 (40)	160 (36)

NHC Official 10-Year Average (1989-1998)	48 (2005)	89 (1790)	128 (1595)	164 (1410)	242 (1107)

*Output from these models was unavailable at time of forecast issuance.

Table 4. Watch and warning summary, Hurricane Dennis, 24 August- 7 September 1999.

Date/Time (UTC)	Action	Location
24/1500	Tropical Storm Warning issued	Bahamas...Turks and Caicos Islands and SE Bahamas
24/1500	Tropical Storm Watch issued	Central Bahamas.
25/0900	Hurricane Watch and Tropical Storm Warning issued	Central Bahamas.
25/0900	Hurricane Watch issued	Northwest Bahamas.
26/0900	Tropical Storm Warning discontinued	Bahamas...Turks and Caicos Islands and SE Bahamas.
26/1500	Hurricane Warning issued	Central Bahamas. Northwest Bahamas...Eleuthera and the Abacos.
27/0300	Tropical Storm Warning issued	Northwest Bahamas...New Providence, Grand Bahama, and the Berry Islands.
27/0900	Hurricane Warning issued	Northwest Bahamas...remainder.
27/1500	Hurricane Watch issued	Florida....Sebastian Inlet to Fernandina Beach.
27/1500	Hurricane Warning discontinued	Central Bahamas...including Andros and New Providence Islands.
27/2100	Tropical Storm Warning issued	Florida...Sebastian Inlet to Flagler Beach.
28/0900	Hurricane Warning discontinued	Bahamas...Eleuthera and the Berry Islands.
28/2100	Hurricane Warning discontinued	Bahamas...Abacos and Grand Bahama Islands.
29/0300	Hurricane Watch issued	N of Savannah, GA to Surf City, NC.
29/0300	Hurricane Watch discontinued	Florida...Sebastian Inlet to Fernandina Beach.
29/0900	Tropical Storm Warning issued	N of Savannah, GA to Surf City, NC.
29/0900	Hurricane Watch issued	North Carolina...Surf City to Cape Hatteras.
29/1500	Tropical Storm Warning issued	North Carolina...Surf City to Cape Hatteras.
29/1500	Tropical Storm Watch issued	N of Cape Hatteras to Cape Charles Light, VA.
29/2100	Hurricane Watch upgraded to Hurricane Warning	Little River Inlet, SC to Oregon Inlet, NC...including Pamlico Sound.
29/2100	Tropical Storm Warning issued	Oregon Inlet, NC to Chincoteague, VA...including Abermarle Sound and southern Chesapeake Bay south of New Point Comfort.
30/0300	Hurricane Watch and Tropical Storm Warning discontinued	Edisto Beach, SC to Savannah, GA.
30/0900	Hurricane Watch upgraded to Hurricane Warning	Oregon Inlet, NC to North Carolina/Virginia border.
30/0900	Gale Warning issued	Chincoteague, VA to Cape Henlopen, DE.
30/0900	Hurricane Watch and Tropical Storm Warning discontinued	N of Savannah, GA to Little River Inlet, SC.
30/2100	Hurricane Warning discontinued	South of Cape Lookout, NC to Little River Inlet, SC.
31/0300	Hurricane Warning downgraded to Tropical Storm Warning	Cape Lookout, NC to NC/VA border.
31/0900	Gale Warning issued	Cape Henlopen, DE to Great Egg Inlet, NJ.
01/0300	Tropical Storm Warning and a Hurricane Watch issued	Surf City, NC to Chincoteague, VA...including Pamlico and Ablemarle Sounds and southern Chesapeake Bay south of New Point Comfort.
01/1500	Hurricane Watch discontinued	Surf City, NC to Chincoteague, VA...including Pamlico and Ablemarle Sounds and southern Chesapeake Bay south of New Point Comfort.
02/0600	Gale Warning discontinued	Fenwick Island, DE to Cape Henlopen, DE.
02/0600	Gale Warning issued	Chincoteague, VA to Fenwick Island, DE.
02/1500	Tropical Storm Warning discontinued	North of Cape Charles Light, VA to Chincoteague, VA South of Cape Lookout, NC to Surf City, NC.
02/2100	Tropical Storm Warning discontinued	Southern Chesapeake Bay south of New Point Comfort.
03/0300	Tropical Storm Warning discontinued	Cape Charles Light, VA to NC/VA border.
	Tropical Storm Warning	

03/0900	discontinued	Oregon Inlet, NC to NC/VA border.
03/2100	Tropical Storm Watch issued	Oregon Inlet, NC to NC/VA border...including Ablemarle Sound. Cape Lookout, NC to Surf City, NC.
04/0900	Tropical Storm Warning issued	N of Oregon Inlet, NC to the NC/VA border...including Ablemarle Sound. S of Cape Lookout, NC to Surf City, NC.
04/1500	Tropical Storm Warning upgraded to Hurricane Warning	NC/VA border to Surf City, NC...including Pamlico and Ablemarle Sounds.
04/1500	Tropical Storm Warning issued	N of NC/VA border to Chincoteague, VA...including Chesapeake Bay south of Smith Point.
04/2100	Tropical Storm Warning issued	Entire Chesapeake Bay...including the Tidal Potomac.
04/2100	Gale Warning issued	N of Chincoteague, VA to Great Egg Inlet, NJ.
05/0100	Hurricane Warning downgraded to Tropical Storm Warning	NC/VA border to Surf City, NC...including Pamlico and Ablemarle Sounds.
05/0900	Tropical Storm Warning discontinued	NC/VA border to Surf City, NC...including Pamlico and Ablemarle Sounds.

2, 2000

Preliminary Report Hurricane Floyd 7 - 17 September, 1999

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PRELIMINARY REPORTS
Tropical Storm Arlene
Tropical Depression Two
Hurricane Bret
Hurricane Cindy
Hurricane Dennis
Tropical Storm Emily
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Floyd was a large and intense Cape Verde hurricane that pounded the central and northern Bahama islands, seriously threatened Florida, struck the coast of North Carolina and moved up the United States east coast into New England. It neared the threshold of category five intensity on the Saffir/Simpson Hurricane Scale as it approached the Bahamas, and produced a flood disaster of immense proportions in the eastern United States, particularly in North Carolina.

a. Synoptic History

Floyd can be traced back to a tropical wave that emerged from western Africa on 2 September. This system was not particularly impressive-looking, in terms of the organization of the convection shown on satellite images, but there was evidence of curvature in the cloud lines. Overall the system was broad and disorganized, yet easily recognizable as a synoptic-scale entity.

The wave proceeded westward across the eastern tropical Atlantic at about the normal speed of propagation, 6 degrees of longitude per day, with little apparent change, for several days. A center of circulation was estimated late on 5 September near 15N 32.5W but the cloud pattern lacked sufficient deep convection for a Dvorak classification. On 6 September, there was enough of a curved band of deep convection present so that the system was classified as a T1.0 on the Dvorak scale around 1200 UTC. A favorable upper-level outflow pattern existed over the area, and the cloud pattern became more consolidated and better organized on the 7th. Tropical Depression Eight formed about 1000 miles east of the Lesser Antilles by 1800 UTC that day.

A deep-layer ridge prevailed to the north of the cyclone and the associated steering current moved the system west-northwestward at 12-15 knots for a couple of days. When it reached a position about 750 n mi east of the Leeward Islands, the cloud pattern became sufficiently well organized for the system to become Tropical Storm Floyd around 0600 UTC 8 September. Even though large-scale conditions appeared conducive for strengthening, there was a lack of a well-defined inner core. This was evidenced by visible, infrared, and microwave imagery that showed no tightly curved banding features or a concentration of deep convection close to the center, a condition that probably prevented rapid intensification

during the early stages of the tropical cyclone. Floyd slowly strengthened and became a hurricane by 1200 UTC 10 September while centered about 200 n mi east-northeast of the northern Leeward Islands.

As Floyd was nearing hurricane status, a mid-tropospheric trough in the vicinity of 60-65W longitude caused a slowing of the forward speed, and then a turn toward the northwest. The northwestward motion continued until the 11th, keeping the hurricane well to the northeast of the islands of the northeastern Caribbean. On the 11th, Floyd neared the southwest portion of the mid-Atlantic upper-tropospheric trough which was situated to the north of Puerto Rico, i.e. close to its climatological position. Historically, hurricanes have had difficulty strengthening in this area. Floyd's upper-level outflow was disrupted over the southern semicircle by the trough and an anticyclone over the eastern Caribbean. Consequently, after strengthening nearly to category three status early on the 11th, the hurricane weakened to 85 knots around 0000 UTC on the 12th. Early on the 12th, rising mid- to upper-tropospheric heights to the north of Floyd forced a turn toward the west. The westward turn also marked the beginning of a major strengthening episode (this phenomenon has also been observed with many past hurricanes, e.g. Andrew of 1992). Maximum sustained winds increased from 95 knots to 135 knots, and the central pressure fell about 40 mb from early on the 12th to early on the 13th. From 0600 to 1800 on the 13th, Floyd was at the top end of category four intensity on the Saffir/Simpson Hurricane Scale.

One potential contributor to the significant strengthening of Floyd was the presence of enhanced upper oceanic heat content along its track. Analyses from the Physical Oceanography Division of NOAA/AOML showed relatively high values of heat content just to the east of the Bahamas a day or two before Floyd passed through the area.

Floyd was aimed at the central Bahamas until late on the 13th, when the heading became west-northwestward. The eye passed just 20 to 30 n mi northeast and north of San Salvador and Cat Islands on the night of the 13th. Floyd's eyewall passed over central and northern Eleuthera on the morning of the 14th, and after turning toward the northwest, Floyd struck Abaco island on the afternoon of the 14th. By the time the hurricane hit Abaco, it had weakened somewhat from its peak, but Floyd was still a borderline category three/four hurricane.

As a mid- to upper-tropospheric trough over the eastern United States eroded the subtropical ridge over the extreme western Atlantic, Floyd continued to turn gradually to the right. The center of the hurricane paralleled the central Florida coast, passing about 95 n mi east of Cape Canaveral around 0900 UTC 15 September. By the afternoon of the 15th, Floyd was abeam of the Florida/Georgia border and headed northward toward the Carolinas.

Although there was a fluctuation in intensity, related to an eyewall replacement event discussed in the next section, overall the intensity of Floyd diminished from the 13th to the 15th. Environmental causes for intensity change are not entirely understood, but two large-scale factors probably contributed to a gradual decline: the entrainment of drier air at low levels from the northwest, and increasing south-southwesterly vertical shear. As Floyd neared the North Carolina coast late on the 15th, its maximum winds decreased below category three status.

After turning toward the north-northeast with forward speed increasing to near 15 knots, Hurricane Floyd made landfall near Cape Fear, North Carolina at 0630 UTC 16 September as a category two hurricane with

estimated maximum winds near 90 knots. Floyd was losing its eyewall structure as it made landfall. Continuing to accelerate north-northeastward, Floyd's center passed over extreme eastern North Carolina on the morning of the 16th and over the greater Norfolk, Virginia area around 1500 UTC that day. Floyd then weakened to a tropical storm and moved swiftly along the coasts of the Delmarva peninsula and New Jersey on the afternoon and early evening of the 16th, reaching Long Island by 0000 UTC 17 September. By that time, the storm's forward speed had increased to near 29 knots. The system decelerated as it moved into New England.

By late on the 16th and early on the 17th, Floyd was becoming more involved with a frontal zone that existed along the Atlantic seaboard. The system took the form of a frontal low and thus became extratropical by the time it reached the coast of Maine at 1200 UTC 17 September. The cyclone turned toward the northeast and then east-northeast, moving over the coast of New Brunswick late on the 17th, Prince Edward Island early on the 18th and Newfoundland late on the 18th and early on the 19th. Floyd's extratropical remnant merged with a large extratropical low over the north Atlantic and was no longer a distinct entity by 1800 UTC 19 September.

b. Meteorological Statistics

Table 1 lists the best track positions and intensities at six-hourly intervals. Figure 1 is a display of this track.

Figure 2a, Figure 2b, and Figure 3 depict the best track curves of maximum one-minute average "surface" (10 meters above ground level) wind speed and minimum central sea-level pressure, respectively, as a function of time. Also plotted on Figure 2a and Figure 3 are aircraft reconnaissance and dropsonde data from the U.S. Air Force Reserves (the Hurricane Hunters) and NOAA, estimates from analyses of surface synoptic data, as well as Dvorak-technique estimates from the Tropical Analysis and Forecast Branch, TAFB, the Satellite Analysis Branch, SAB, and the U.S. Air Force Weather Agency (AFGWC in the figures) using satellite imagery. Figure 2b also shows the best track wind speed curve, but with only *in situ* data, i.e. flight level and dropsonde wind measurements. In both Figure 2a and Figure 2b the flight level winds are adjusted for elevation (90% of 700 mb wind speeds, 80% of 850 mb speeds, and 85% of 1500 ft speeds), and dropsonde wind measurements above the surface are adjusted to the 10 meter level using a mean hurricane eyewall profile determined by previous dropsonde measurements.

The peak intensity of Floyd, 135 knots, is based upon roughly 90% of the highest flight level (700 mb) winds of 149 knots at 0933 UTC 13 September. Minimum dropsonde-measured central pressure was 921 mb at 1121 UTC on that date.

Floyd is estimated to have been a 90-knot hurricane at landfall in North Carolina.

There was a 10 meter anemometer measurement of sustained winds of 83 knots at 0710 UTC with gusts to 106 knots at 0716 UTC taken by University of Oklahoma meteorology professor Josh Wurman near Topsail Beach North Carolina. There were also unofficial reports of peak wind gusts to 120 knots (at 8 stories elevation) at Wrightsville Beach and 104 knots at the Wilmington Emergency Operations Center.

Table 2 lists ship reports of tropical storm force or greater wind speeds associated with Floyd. Table 3 lists a selection of surface

observations from land stations and data buoys. Floyd's eye passed over NOAA data buoy 41010, located about 105 n mi east-northeast of Cape Canaveral, around 0900 UTC 15 September. That buoy reported maximum 8-minute averaged winds of 72 knots at an anemometer height of 5 meters. At least three factors would imply a higher value for the 1-minute, 10 meter wind speed from the buoy observation: 1) going from an 8-minute to a 1-minute average; 2) going from 5 meters to 10 meters elevation; and 3) the presence of waves over 50 feet high. The best track intensity of Floyd when it passed over the buoy is near 100 knots, as indicated by dropsonde and aircraft flight level wind data. The center of the hurricane passed about 25 n mi west of the Frying Pan Shoals C-MAN station located about 30 n mi southeast of Cape Fear at 0500 UTC 16 September. This station reported winds sustained at 86 knots for a 20-minute period centered at that time, at an anemometer height of 44 meters.

On 13 September, just after Floyd reached maximum strength, there was evidence of a concentric eyewall. Figure 4 is a sequence of microwave images produced by the Naval Research Laboratory. Note that in the first image, during the deepening phase, there was a dominant inner eyewall with an eye diameter of 20 to 25 n mi. Later on, after peak intensity was reached, there was some indication of a concentric eyewall, particularly in the last image of this sequence. It is interesting to note that after this period, there was an apparent eyewall replacement, as suggested in the microwave image sequence shown in Figure 5, and in radar imagery from NOAA/WP-3D aircraft research missions (not shown). It can be seen that the inner eyewall was dissipating while Floyd was centered near Eleuthera. This corresponded to a weakening of the hurricane to near 105 knots. The outer convective ring became the new eyewall by the time Floyd was centered over Abaco, corresponding to an eye diameter near 50 n mi. Afterwards, the new eye failed to contract significantly, while Floyd re-strengthened just slightly as it reached Abaco. After the disintegration of the inner eyewall the large-scale environment, as noted in the previous section, became less favorable. Consequently, after leaving the Bahamas, Floyd never regained its former intensity and, in fact, slowly weakened.

Heavy rainfall preceded Floyd over the mid-Atlantic states due to a pre-existing frontal zone and the associated overrunning. Hence, even though the tropical cyclone was moving fairly quickly, precipitation amounts were very large. Rainfall totals as high as 15 to 20 inches were recorded in portions of eastern North Carolina and Virginia. At Wilmington, North Carolina, the storm total of 19.06 inches included a 24-hour record of 15.06 inches. Totals of 12 to 14 inches were observed in Maryland, Delaware, and New Jersey. New records were set in Philadelphia for the most amount of rain in a calendar day, 6.63 inches. In southeastern New York, rainfall totals were generally in the 4 to 7 inch range but there was a report of 13.70 inches at Brewster. Totals of nearly 11 inches were measured in portions of New England.

Storm surge values as high as 9 to 10 feet were reported along the North Carolina coast.

A number of tornadoes were sighted in eastern North Carolina. There was a confirmed tornado in Bertie County and another in Perquimans County. The latter tornado destroyed two houses and damaged three or four others. At least ten tornadoes were reported by spotters in the Newport/Morehead City County Warning area, and these apparently caused some structural damage. Four tornadoes or funnel clouds were seen in the Wilmington area, but no damage was apparent.

c. Casualty and Damage Statistics

There were 57 deaths that were directly attributable to Floyd, 56 in the United States and 1 in Grand Bahama Island. The death toll by state is as follows: North Carolina 35, Pennsylvania 6, New Jersey 6, Virginia 3, Delaware 2, New York 2, Connecticut 1, and Vermont 1. Most of these deaths were due to drowning in freshwater flooding. Floyd was the deadliest hurricane in the United States since Agnes of 1972.

In the United States, the Property Claims Services Division of the Insurance Services Office reports that insured losses due to Floyd totaled 1.325 billion dollars. Ordinarily this figure would be doubled to estimate the total damage. However, in comparison to most hurricane landfalls, in the case of Floyd there was an inordinately large amount of freshwater flood damage, which probably alters the two to one damage ratio. Total damage estimates range from 3 to over 6 billion dollars.

d. Forecast and Warning Critique

When averaged over the entire lifetime of the hurricane, the track forecasts for Floyd were excellent. Table 4 shows the average track errors for the official forecast and for a selection of objective guidance models. It can be seen that the average official forecast errors were substantially below the most recent ten-year averages. Also, on average, the official forecasts were better than all of the guidance except the UKMI model which had average track errors that were about equal to those of the official forecasts.

Although the *overall* average official forecast errors for Floyd were extremely low, the official forecasts were just ordinary if one considers only the period when hurricane warnings were in effect for the United States,. For example, the average 24-hour track forecast error for the latter period was roughly the same as the most recent ten-year average. Official track forecasts during the latter period also had a westward bias, and were somewhat slow. For example, the 36-hour official track forecasts during the period when hurricane warnings were in effect for the United States were an average of 104 n mi too far west and 70 n mi too far south. All of the track guidance models showed a similar westward and slow bias during this period.

Official intensity forecasts were fairly good (errors of 10 knots or less) for the first couple of days of Floyd's history. However, there were some large underforecasts of intensity, by as much as 30 to 40 knots, from 10-12 September. After Floyd reached its maximum intensity, the official forecasts did not show enough weakening. From 13 September onward, the wind speed was overpredicted in the advisories at practically every forecast time interval, by as much as 30 to 40 knots, and even 50 knots in one occasion. The Statistical Hurricane Intensity Prediction Scheme, SHIPS, performed similarly.

Table 5 is a chronology of the various watches and warnings that were issued for Floyd. A hurricane warning was issued for the northwest Bahamas more than 24 hours prior to the arrival of the eyewall at Eleuthera. For the United States, practically the entire east coast (the greater Miami area northward to Plymouth Massachusetts) was put under a hurricane warning for Floyd. To the authors' knowledge, the last time such an event occurred was during Hurricane Donna of 1960. Hurricane warnings for the southeast Florida coast proved unnecessary. However, given the forecast uncertainty and the required response times for evacuations and other preparations for such a large, severe hurricane, it was prudent to issue such warnings. The hurricane warning was issued for the coast of North Carolina at 0300 UTC 15 September. This is about 26-27 hours prior to the

arrival of the eyewall in the Cape Fear area. Generally, for the coasts of South and North Carolina, hurricane warnings were issued at least 24 hours before the onset of tropical storm force winds.

According to preliminary information provided to the Federal Emergency Management agency, over 2 million people were evacuated for Floyd in the United States. This is probably the largest evacuation in U.S. history.

Acknowledgements

Some of the data in this report was furnished by local National Weather Service Offices in Miami, Melbourne, Jacksonville, Charleston, Wilmington, Newport/Morehead City, Raleigh/Durham, Wakefield, Baltimore/Washington, Mount Holly, New York, and Taunton. Stephen Baig produced the track chart, and James Franklin produced the wind and pressure plots.

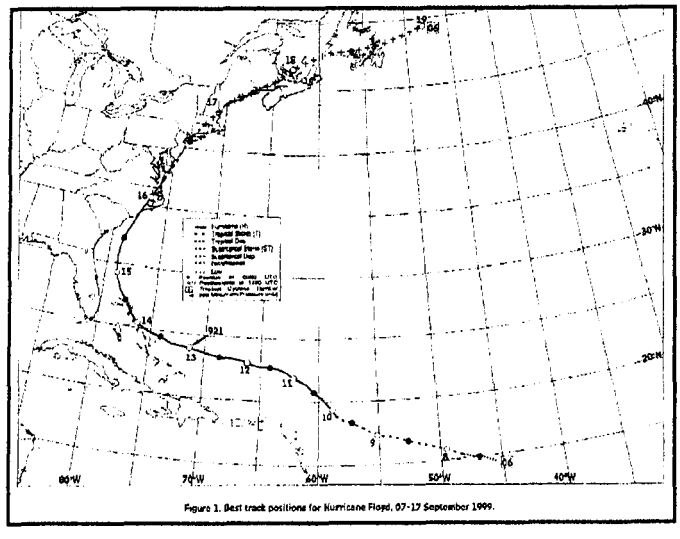


Figure 1. Best track for Hurricane Floyd, 7-17 September 1999.

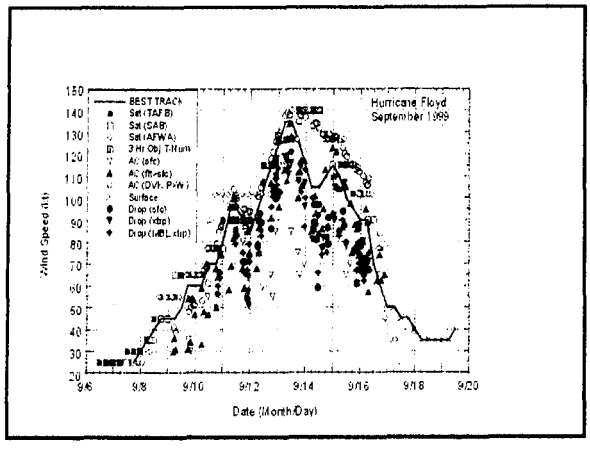


Figure 2a. Best track maximum sustained wind speed curve for Hurricane Floyd, showing all available intensity estimates and wind observations. Aircraft wind measurements have been adjusted for elevation (90% of 700 mb wind speeds, 80% of 850 mb speeds, and 85% of 1500 ft speeds), and dropsonde wind measurements above the surface are adjusted to the 10 meter level using a mean hurricane eyewall profile determined by previous dropsonde measurements. Vertical line denotes landfall.

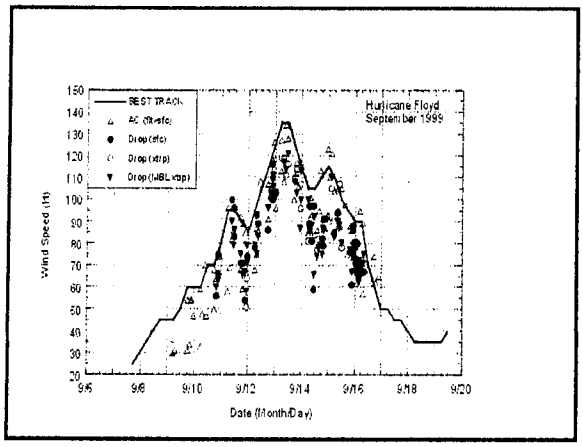


Figure 2b. Best track maximum sustained wind speed curve for Hurricane Floyd, showing only in situ wind observations adjusted for elevation as indicated in Figure 2a.

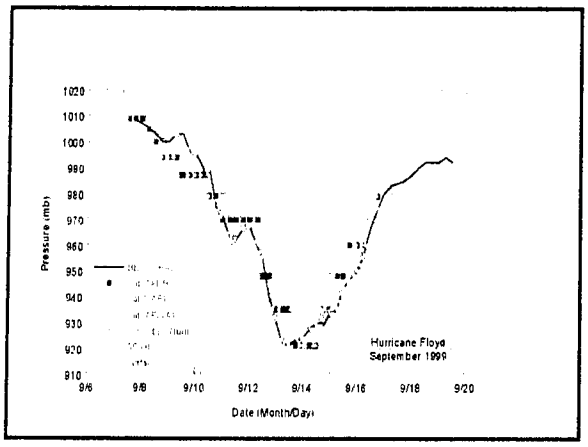


Figure 3. Best track minimum central pressure curve and central pressure observations or estimates for Hurricane Floyd. Vertical line denotes landfall.

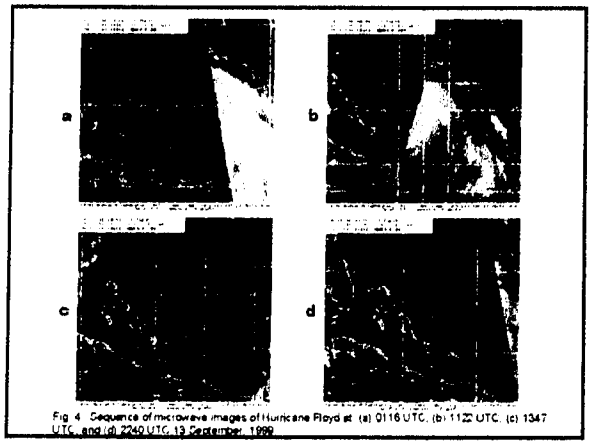


Figure 4. Sequence of microwave images of Hurricane Floyd at: (a) 0116 UTC, (b) 1122 UTC, (c) 1347 UTC, and (d) 2240 UTC 13 September, 1999.

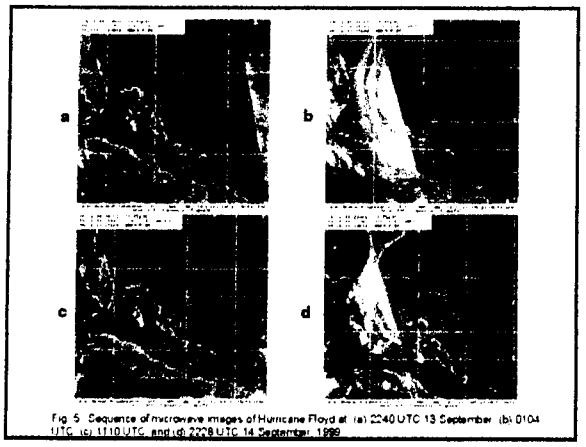


Figure 5. Sequence of microwave images of Hurricane Floyd at: (a) 2240 UTC 13 September, (b) 0104 UTC, (c) 1110 UTC, and (d) 2228 UTC 14 September, 1999.

Table 1. Best track, Hurricane Floyd, 7 - 17 September, 1999

Date/Time (UTC)	Position		Pressure (mb)	Wind Speed (kt)	Stage
	Lat. (°N)	Lon. (°W)			
7/1800	14.6	45.6	1008	25	tropical depression
8/0000	15.0	46.9	1007	30	"
0600	15.3	48.2	1005	35	tropical storm
1200	15.8	49.6	1003	40	"
1800	16.3	51.1	1000	45	"
9/0000	16.7	52.6	1000	45	"
0600	17.1	53.9	1003	45	"
1200	17.3	55.1	1003	50	"
1800	17.9	56.3	996	60	"
10/0000	18.3	57.2	995	60	"
0600	18.6	58.2	990	60	"
1200	19.3	58.8	989	70	hurricane
1800	20.2	59.6	975	70	"
11/0000	20.8	60.4	971	80	"
0600	21.4	61.1	963	95	"
1200	21.9	62.0	962	95	"
1800	22.5	63.0	966	90	"
12/0000	22.7	64.1	967	85	"
0600	22.8	65.2	960	95	"
1200	23.0	66.2	955	105	"
1800	23.2	67.4	940	115	"
13/0000	23.4	68.7	931	125	"
0600	23.6	70.0	922	135	"
1200	23.9	71.4	921	135	"
1800	24.1	72.9	923	125	"
14/0000	24.5	74.0	924	115	"
0600	24.9	75.3	927	105	"
1200	25.4	76.3	930	105	"
1800	26.1	77.0	930	110	"
15/0000	27.1	77.7	933	115	"

0600	28.2	78.5	935	110	"
1200	29.3	78.9	943	100	"
1800	30.6	79.1	947	95	"
16/0000	32.1	78.7	950	90	"
0600	33.7	78.0	956	90	"
1200	35.7	76.8	967	70	"
1800	38.0	75.3	974	60	tropical storm
17/0000	40.6	73.5	980	50	"
17/0600	42.1	72.1	983	50	tropical storm
1200	43.3	70.6	984	45	extratropical
1800	44.2	68.9	985	45	"
18/0000	44.8	67.3	987	40	"
0600	45.4	65.5	990	35	"
1200	46.6	63.0	992	35	"
1800	47.7	59.3	992	35	"
19/0000	48.0	56.3	992	35	"
0600	48.5	52.5	994	35	"
1200	49.5	48.0	992	40	"
1800					merged with low
13/1200	23.9	71.4	921	135	**minimum pressure**
					Landfalls
14/1200	25.4	76.3	930	105	Near Alice Town, Eleuthera
14/1900	26.3	77.1	932	120	Near Cherokee Sound, Abaco
16/0630	33.8	78.0	956	90	Near Cape Fear, North Carolina

Table 2. Ship reports of 34 knots or higher wind speed associated with Hurricane Floyd, September 1999.

Date/Time (UTC)	Ship call sign	Lat. (°N)	Lon. (°W)	Wind dir/speed (deg/kt)	Pressure (mb)
08/1500	**PDYI**	19.0	52.6	070/39	1011.1
09/0900	**DFSO**	17.2	53.7	180/37	1004.2
09/1200	**DFSO**	16.9	54.5	210/37	1005.2
09/1500	**DFSO**	16.6	55.4	180/45	1005.5
12/1500	**DGOO**	22.7	69.3	320/35	1001.5
12/1800	**DGOO**	23.5	69.5	340/37	998.5
12/1800	**ZCAH3**	24.9	63.1	130/58	1009.3
12/2100	**DGOO**	24.1	69.8	030/43	994.8
13/0000	**DGOO**	24.5	69.9	040/45	994.8
13/0300	**DGOO**	24.9	70.3	040/52	997.0
13/0600	**DGOO**	25.6	70.5	040/52	998.5
13/0900	**DGOO**	26.3	70.8	060/52	999.5
13/1200	**DILD**	24.9	53.1	170/37	1013.9
13/1200	**DGOO**	27.0	71.0	090/52	1002.9
13/1800	**KHRH**	19.5	74.7	360/50	994.0

13/1800	WZJF	21.3	66.9	135/35	1009.5
14/0000	PPXI	30.6	74.3	070/50	1001.0
14/0900	WGJT	22.0	73.5	180/35	998.2
14/1200	PPXI	30.4	71.0	110/45	1001.0
14/1500	PEXU	26.7	70.6	120/37	1009.2
15/0300	SHIP	30.3	74.3	100/45	1006.5
15/0900	DGOS	29.3	73.8	130/38	1004.0
15/1200	DGOS	28.9	73.8	130/47	1003.5
15/1200	PFKV	30.6	74.0	120/38	1004.4
15/1800	PFKV	30.3	74.0	130/36	1003.6
16/0000	WRGQ	31.5	75.4	160/46	(898.1)
16/0300	PEXU	29.4	73.9	190/36	1008.5
16/0600	WRGQ	31.2	75.2	200/41	1001.0
16/0600	SHIP	36.8	73.0	140/36	1006.8
16/1200	WZJE	32.0	71.6	180/38	1008.5
16/1200	3ELL6	32.0	72.5	200/36	1007.2
16/1800	BKJO	34.7	72.2	190/60	1005.0
16/1800	WZJE	32.1	72.3	210/52	1009.6
16/2100	DEDI	40.4	70.9	130/42	998.0
16/2100	SHIP	36.6	69.5	180/47	1007.0
17/0000	DEDI	40.4	70.8	140/50	993.3
17/0000	SHIP	36.6	68.4	190/40	1009.5
17/0000	WAUU	36.0	68.5	190/46	1009.7

Table 3. Hurricane Floyd, selected surface observations, September 1999.

	Minimum sea-level pressure		Maximum surface wind speed (kt)					
Location	**Press. (mb)**	**Date/ time (UTC)**	**Sust. wind[a] (kts)**	**Peak gust (kts)**	**Date/ time[b] (UTC)**	**Storm surge[c] (ft)**	**Storm tide[d] (ft)**	**Rain (storm total) (in)**
Bahamas								
Grand Bahama Island	983.0	15/0100	52	65	14/2000		5.27	
Little Harbor Abacos	929.0	14/1910						9.32
Nassau			55	68				
Florida								
Craig Field	994.6	15/1653	37		15/1929			
Daytona Beach	991.8	15/1353	36	60	15/1053			1.23
Fowey Rocks Lighthouse	995.5	14/2300	36	44	14/1600			
Ft. Lauderdale Exec	994.9	14/2253	23	33	15/0653			0.01
Ft. Lauderdale Int'l	994.6	14/2253	25	36	14/2201			0.10
Ft. Pierce	989.5	15/0735	29	43	15/0736			
Gainesville	994.6	15/1653	33		15/1407			
Jacksonville Int'l	995.3	15/1656	40		15/0907			
Lake Worth Pier	993.4	14/2200	32	49	14/1700			

Leesburg	996.4	15/1053	20	27	15/1153			
Melbourne Airport	989.1	15/0900	45	59	15/0501			1.35
Melbourne WFO			32	52	15/0655			
Miami	995.8	14/2256	19	29	15/0322			0.04
Ocala	998.0	15/1035	28		15/1535			
Orlando	993.8	15/0853	24	42	15/0853			1.26
Patrick AFB (COF)			49	57	15/0820			
Sanford			25	37	14/2024			3.20
Tamiami Airport	996.4	14/2253	21	31	14/1953			
West Palm Beach	992.9	15/0453	27	38	14/1941			0.38
Georgia								
Alma	999.7	15/0950	28		15/1746			
Brooklet								0.41
Dover								0.40
Ludowici								0.52
Newington								0.85
Rocky Ford								0.20
Savannah Airport			35	46	15/1810			
St. Simon's Island	993.2	15/1804	40		15/1804			
South Carolina								
Allendale								0.67
Beaufort								1.83
Charleston City Office			50	74	16/0150			3.99
Charleston Harbor							10.1	
Charleston Int'l Airport	989.5	15/0052	44	58	16/0046			3.91
Edisto Beach State Park			33	47	16/0029			
Florence Airport	991.2	16/0655	36	54	16/0158			4.04
Folly Beach			47	62	15/2300			
Grand Strand	977.0	16/0553		57	16/0523			
Ladson Oakbrook								4.30
Myrtle Beach Airport	979.7	16/0553		62	16/0455			16.06
Myrtle Beach Springmaid Pier				68	16/0500			
Ridgeville								3.58
St. George								1.90
Walterboro								2.50
Williams								2.42
North Carolina								
Beaufort	976.0	16/0409	42	58	16/0405			5.56
Castle Hayne 2E				81	16/0715			
Castle Hayne 3SW				104	16/0845			
Cherry Point MCAS	961.4	16/0555	56	71	16/0405			3.27
Elizabeth City	968.5	16/1418	34	56	16/1346			2.65
Federal Point				97	16/0620			
Flemington				80	16/0625			
Frisco	983.8	16/0740	51	61	16/0805			0.34
Greenville				51	16/0800			
Holden Beach			42	64	16/0820			

Manteo				53	16/1000			
Masonboro Island							10.3	
Mt. Olive				65	16/0520			
Myrtle Grove				89	16/0540			
Newport				58	16/0454			
New Bern	961.1	16/0543	39	58	16/0501			4.29
New River	959.0	16/0426	44	68	16/0556			8.26
Oak Island			52	69	16/0820		10.0	
Pleasure Island							10.0	
Rocky Mount/Wilson Airport								15.15
Seymour Johnson AFB	983.0	16/0955	45	60	16/1055			
South River								3.50*
Washington				41	16/0800			
Wilmington Airport	959.7	16/0755	54	75	16/0855			19.06
Wilmington Corning Plant				89	16/0700			
Wilmington EOC				104	16/0845			
Wrightsville Beach				120				
Virginia								
Fort Eustis	985.2	16/1455	25	37	16/1640			
Glouchester								11.25
Hampton								7.50
James City County								14.30
Langley AFB			40	55	16/1355			
Lower James City								12.83
Newport News	983.4	16/1558	33	44	16/1623			16.57
Norfolk Airport	977.1	16/1551	27	40	16/1303			
Norfolk NAS	979.1	16/1555	38	48	16/1609			
Oceana NAS	975.7	16/1556	35		16/1656			
Portsmouth	978.3	16/1600	30	52	16/1614			10.10
Richmond	991.9	16/1640	29	44	16/1405			6.54
Smithfield								12.50
Wakefield WFO								12.73
Weems								10.83
Yorktown								
Maryland								
Annapolis								11.60
Cambridge							2.5	
Chestertown								14.00
Lewisetta							3.5	
Martin State Airport	989.0							
Mid-Bay Buoy				60	16/1710			
Ocean City	976.8	16/1853	31	45	16/1653			1.71
Patuxent NAS	991.0		30	36	16/1555			
Salisbury	980.4	16/1851	28	42	16/2150			5.08
Solomon's Island							3.0	
St. Inigoes	987.6							
Tall Timbers				62	16/2040			11.10
Thomas Point Light			43	49	16/1300			

Delaware								
Cape Henlopen				56	16/PM			
Greenwood								10.58
Lewes						2.6	6.76	
Vernon								12.36
Wilmington	986.0	16/2106	32	40	16/2214			
New Jersey								
American Corners								10.20
Atlantic City	980.2	16/2054	23	34	16/2345	2.0	6.22	
Caldwell/Essex Co. Airport	987.8	16/2353		38	16/2353			10.21
Cape May						2.6	7.36	
Doylestown								10.07
Federalsburg								11.20
Neshanic								10.07
Newark Int'l Airport	985.1	16/2351	38	46	16/2351			6.22
Pequannock								11.04
Sandy Hook	981.0	16/2306	34	45	17/0024	1.9	6.57	
Somerville								13.34
Teterboro Airport	985.0	16/2351	24	38	16/2351			8.53
Wayne/Iflows								12.21
White House								12.98
Pennsylvania								
Philadelphia	985.0	16/2136	32	42	16/2136	2.8	9.34	
New York								
Central Park	983.8	16/2250	25	36	16/1450			5.02
Farmingdale Airport	981.6	16/2353	23	37	16/2053			3.13
HPN Airport	985.8	17/0050	25	42	16/2350			6.26
Islip/MacArthur Airport	983.4	17/0156	27	37	16/2356			
JFK Int'l Airport	982.5	16/2351	30	41	17/0051			3.27
LaGuardia Airport	983.7	16/2351	30	41	17/0051			4.94
MGJ Airport			29	44	16/2039			
MTP Airport	986.9	17/0254	22	37	17/0454			
Newburgh/Stewart Airport	992.6	17/0045	34	54	16/2245			
NWS Upton								3.50
Westhampton Airport	984.8	17/0153	28	43	17/0153			
White Plains Airport	985.8	17/0050	25	42	16/2350			
Massachusetts								
Beverly				31				
Blue Hill Observatory-Milton				40				
Boston							10.7	
Boston/Logan Airport				38				
Brewster				63	17/0545			
Buzzards Bay			47	57	17/0300			
Fox Point Hurricane Barrier						4.2		
Hadley								9.60

Hyannis				62				
Lawrence				32				
Martha's Vineyard				34				
Nantucket				32			1.3	
New Bedford Hurr. Barrier				64	17/0600	2.5		
Norwood				27				
Orange				29				
Plymouth				33				
Southwick								9.16
Taunton				38				
Westfield				37				
Worcester				30				
Rhode Island								
Block Island				39				
Newport				35			2.6	
Providence				35			5.9	
Westerly				31				
Connecticut								
Bridgeport Airport	981.8	17/0154	29	39	16/2254			
Bristol								10.80
Burlington								9.45
Danbury Airport	987.1	17/0153	15	21	17/0153			
Groton/New London Airport	986.8	17/0145	30	43	17/0045			
Hartford Airport	985.4	17/0253						
Meriden	984.5	17/0156						
MMK Airport	986.4	17/0155	20	34	17/0155			
New Haven Airport	983.8	17/0145	33					
Southington								9.14
Willimantic	985.8	17/0352		31				
Windsor Locks				37				
New Hampshire								
Manchester				28				
NOAA National Data Buoy Center buoys								
41004 (30.5N 79.1W)			54	72	16/0200			
41009 (28.5N 80.2W)	980.9	15/0900	52	70	15/1000			
41008 (31.4N 80.9W)			24	31	15/2100			
41010 (28.9N 78.5W)	939.6	15/0900	72	91	15/0700			
44009 (38.5N 74.7W)	976.0	16/1900	39	52	16/1800			
44014 (36.8N 74.8W)	981.4	16/1600	50	66	16/1615			
44025 (40.3N 73.2W)	980.0	17/0000	33	43	17/0600			
NOAA National Data Buoy Center C-MAN stations								
BUZM3 (41.4N 71.0W)			47	57	17/0300			
CLKN7 (34.6N 76.5W)	974.9	16/0500	63	79	16/0450			
DSLN7 (31.2N								

75.3W)	985.8	16/0730	69	82	16/0750			
DUCN7 (36.2N 75.8W)	977.0	16/0900	67	83	16/0850			
FPSN7 (33.5N 77.6W)	958.7	16/0600	86	97	16/0512			
SAUF1 (29.9N 81.3W)	992.9	15/1200	58		15/1200			

[a]ASOS and C-MAN are 2 min; buoys are 8 min.
[b]Date/time is for sustained wind when both sustained and gust are listed.
[c]Storm surge is water height above normal astronomical tide level.
[d]Storm tide is water height above National Geodetic Vertical Datum (1929 mean sea level).

Table 4. Preliminary forecast evaluation of Hurricane Floyd, heterogeneous sample. (Errors in nautical miles for tropical storm and hurricane stages with number of forecasts in parenthesis).

Forecast Technique	Period (hours)				
	12	24	36	48	72
CLIP	40 (35)	88 (33)	148 (31)	206 (29)	312 (25)
GFDI	36 (34)	71 (32)	97 (30)	115 (28)	153 (25)
GFDL*	31 (30)	66 (30)	96 (28)	109 (26)	155 (24)
LBAR	30 (34)	59 (32)	92 (30)	112 (28)	120 (24)
AVNI	38 (35)	77 (33)	119 (31)	141 (29)	187 (25)
BAMD	37 (34)	70 (32)	106 (30)	147 (28)	239 (24)
BAMM	50 (34)	96 (32)	137 (30)	175 (28)	243 (24)
BAMS	63 (34)	123 (32)	173 (30)	207 (28)	263 (24)
A98E	35 (33)	72 (31)	113 (29)	120 (27)	174 (24)
NGPI	39 (29)	69 (27)	101 (25)	123 (23)	146 (19)
UKMI	29 (32)	54 (30)	66 (26)	76 (24)	97 (21)
NHC OFFICIAL	28 (35)	53 (33)	73 (31)	73 (29)	104 (25)
NHC OFFICIAL 1989-1998 10-year average	48 (2005)	89 (1790)	128 (1595)	164 (1410)	242 (1107)

* GFDL output not available until after forecast issuance.

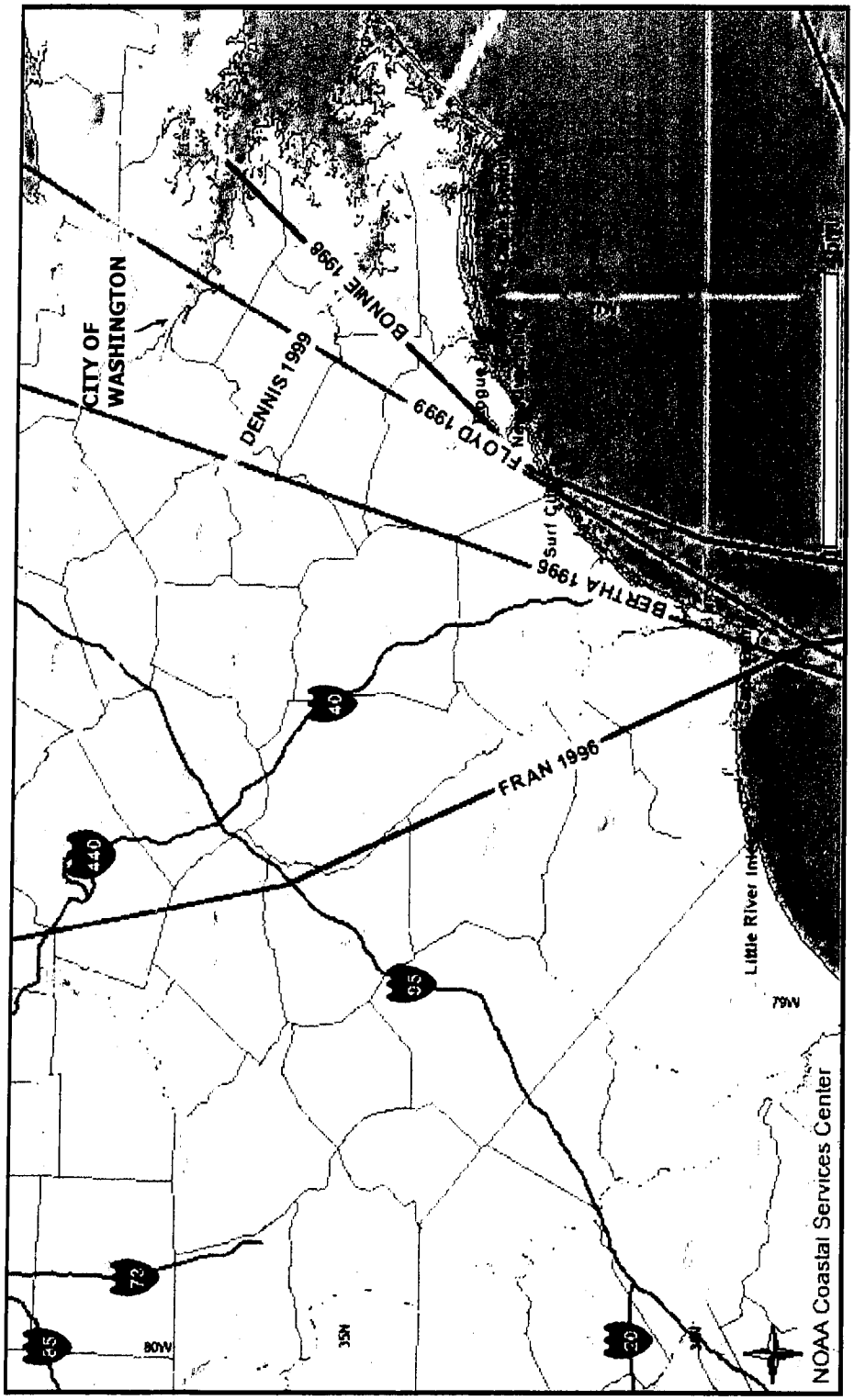
Table 5. Watch and warning summary, Hurricane Floyd, September 1999

Date/Time (UTC)	Action	Location
09/2100	Tropical storm watch issued	Antigua, Barbuda, Anguilla, and Dutch Saint Maarten
09/2200	Tropical storm watch issued	French Saint Martin and Saint Barthelemy
11/0300	Tropical storm watch discontinued	Antigua, Barbuda, Anguilla and Dutch Saint Maarten
11/0300	Tropical storm watch discontinued	French Saint Martin and Saint Barthelemy
12/0900	Tropical Storm warning and hurricane watch issued	Turks, Caicos, and Southeast Bahamas
12/0900	Hurricane watch issued	Central Bahamas

13/0000	Hurricane warning issued	Central Bahamas
13/0000	Hurricane watch issued	Northwest Bahamas
13/0900	Hurricane watch upgraded to hurricane warning	Northwest Bahamas
13/0900	Hurricane watch issued	Florida: South of Flagler Beach to Hallandale
13/1500	Hurricane watch extended	South to include Miami-Dade County and north of Flagler Beach, Florida to Brunswick, Georgia
13/1800	Hurricane watch extended	Including Lake Okeechobee
13/2100	Hurricane watch upgraded to hurricane warning	Florida City, Florida to south of Brunswick, Georgia
13/2100	Tropical storm warning issued	Florida Keys, north of Seven Mile Bridge
13/2100	Hurricane watch issued	Georgia: Brunswick to Savannah
14/0300	Hurricane watch extended	North of Savannah, Georgia to Little River Inlet, South Carolina
14/0900	Tropical storm warning discontinued	Turks and Caicos Islands
14/1500	Tropical storm warning discontinued	Southeast Bahamas
14/2100	Tropical storm warning discontinued	Florida Keys, from the Seven Mile Bridge northward
14/2100	Hurricane warning extended	Georgia and South Carolina coasts to Little River Inlet, South Carolina
14/2100	Hurricane warning downgraded to tropical storm warning	Florida: Florida City to Boca Raton
14/2100	Hurricane watch extended	North of Little River Inlet, South Carolina to Cape Charles Light, Virginia, south of New Point Comfort, including Pamlico and Albermarle sounds
15/0300	Hurricane warning extended	North of Little River Inlet, South Carolina to the North Carolina/Virginia border
15/0300	Hurricane warning discontinued	Florida: Boca Raton to Ft. Pierce
15/0300	Hurricane watch extended	North Carolina/Virginia border to Chincoteague, Virginia, including Chesapeake Bay, south of Smith Point
15/0300	Hurricane warning discontinued	Central Bahamas
15/0300	Tropical storm warning discontinued	Florida: Florida City to Ft. Pierce
15/0600	Hurricane warning discontinued	Northwest Bahamas: New Providence, Bimini, Andros, and Berry Islands
15/0900	Tropical storm watch issued	Chincoteague, Virginia to Cape Henlopen, Delaware, including Chesapeake Bay north of Smith Point and the Potomac from Cobb Island to Smith Point
15/1200	Hurricane warning discontinued	Florida: South of Sebastian Inlet to Ft. Pierce Northwest Bahamas: Grand Bahama and Abaco Islands
15/1500	Hurricane warning discontinued	Florida: Sebastian Inlet to Titusville
15/1500	Tropical storm watch extended	North of Chincoteague, Virginia to Sandy Hook, New Jersey, including Delaware Bay
15/1700	Tropical storm watch extended	North of Sandy Hook, New Jersey to Montauk Point on Long Island, New York, including Delaware Bay
15/1900	Hurricane warning discontinued	Florida: Titusville to Fernandina Beach
15/2100	Hurricane warning extended	North of North Carolina/Virginia border to Chincoteague, Virginia, including Chesapeake Bay, south of Smith Point
15/2100	Tropical storm watch upgraded to tropical storm warning	North of Chincoteague, Virginia to Sandy Hook, New Jersey, including northern Chesapeake Bay, the Potomac Basin, and Delaware Bay

15/2100	Tropical storm watch extended	North of Sandy Hook, New Jersey to the Merrimack River, Massachusetts, including Long Island Sound
16/0300	Hurricane warning discontinued	North of Fernandina Beach, Florida to Edisto Beach, South Carolina
16/0300	Hurricane warning extended	North of Chincoteague, Virginia to Cape Henlopen, Delaware
16/0300	Tropical storm warning extended	North of Sandy Hook, New Jersey to Plymouth, Massachusetts
16/0900	Hurricane warning extended	North of Cape Henlopen, Delaware to Manasquan Inlet, New Jersey and from Moriches Inlet, New York to Plymouth, Massachusetts
16/0900	Tropical storm warning extended	North of Plymouth, Massachusetts to Merrimack River, Massachusetts
16/1100	Hurricane warning discontinued	From South Santee River, South Carolina, southward
16/1300	Hurricane warning discontinued	South Santee River, South Carolina to Surf City, North Carolina
16/1500	Hurricane warning discontinued	North Carolina: North of Surf City to Cape Hatteras
16/1800	Hurricane warning discontinued	Cape Hatteras, North Carolina to Cape Charles Light, Virginia, including southern Chesapeake Bay
16/2100	Hurricane warning downgraded to tropical storm warning	Cape Charles Light, Virginia to the Merrimack River, Massachusetts, including Chesapeake Bay, the Potomac Basin, Delaware Bay, and Long Island Sound
17/0300	Tropical storm warning discontinued	Cape Charles Light, Virginia to Sandy Hook, New Jersey, including Chesapeake Bay, the Potomac Basin, and Delaware Bay
17/0900	Tropical storm warning discontinued	Sandy Hook, New Jersey to the Merrimack River, Massachusetts, including Long Island Sound

North Carolina Hurricane Tracks for 1996 to 1999



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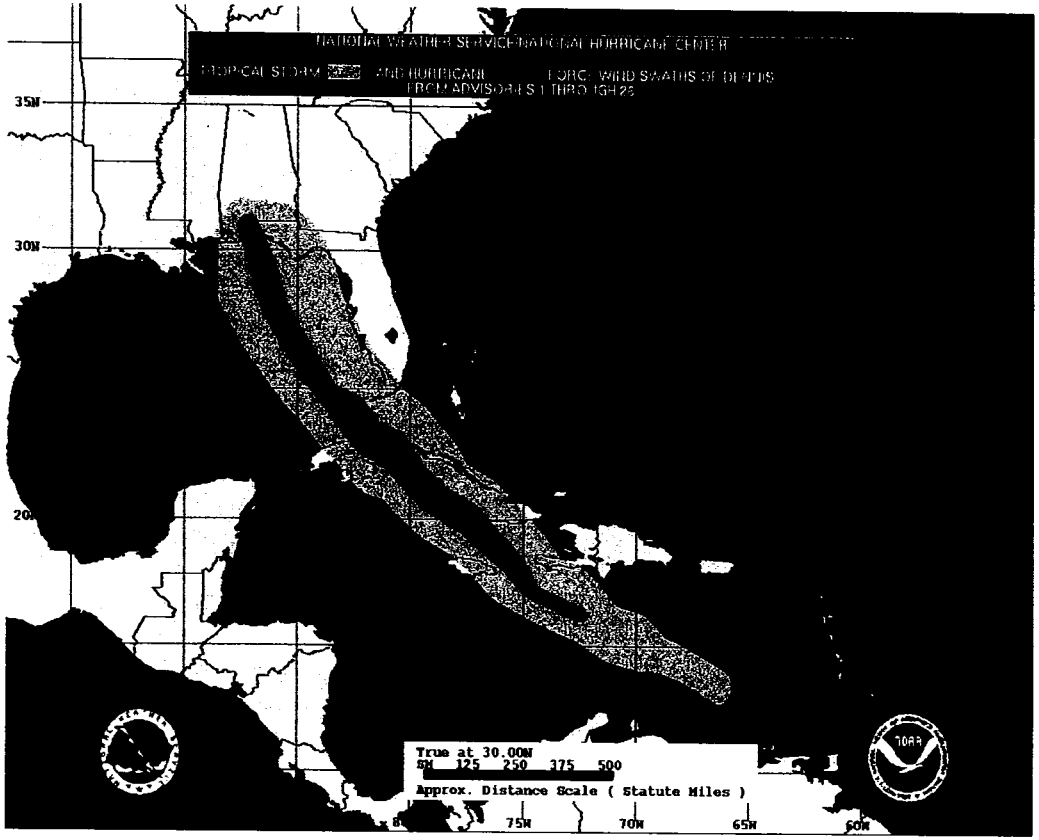

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Florida Public Service Commission
Docket No. 070299-EI
GULF POWER COMPANY
Witness: E. J. Battaglia
Exhibit No. ____ (EJB-2)
Schedule 9
Page 1 of 1

FLORIDA PUBLIC SERVICE COMMISSION
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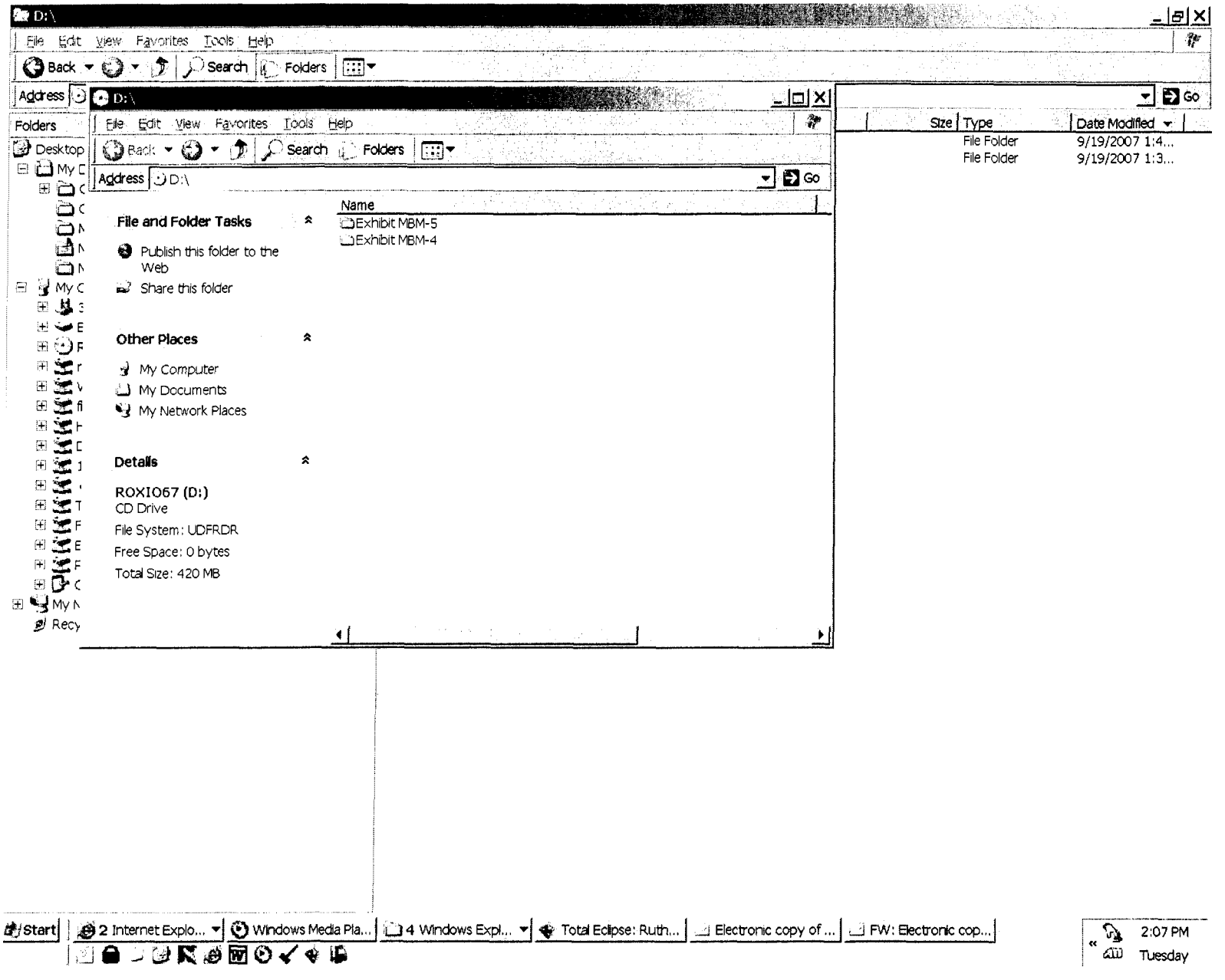

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI **EXHIBIT** 41
COMPANY FPL (Rebuttal
WITNESS Manuel B. Miranda (MBM-4)
DATE 10/02+03/07

BEFORE THE FLORIDA
PUBLIC SERVICE COMMISSION

DOCKET NO. 070301-EI
FLORIDA POWER & LIGHT COMPANY

IN RE: FLORIDA POWER & LIGHT COMPANY'S 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342 F.A.C.

SEPTEMBER 14, 2007

EXHIBIT MBM-4 OF:

MANUEL B. MIRANDA

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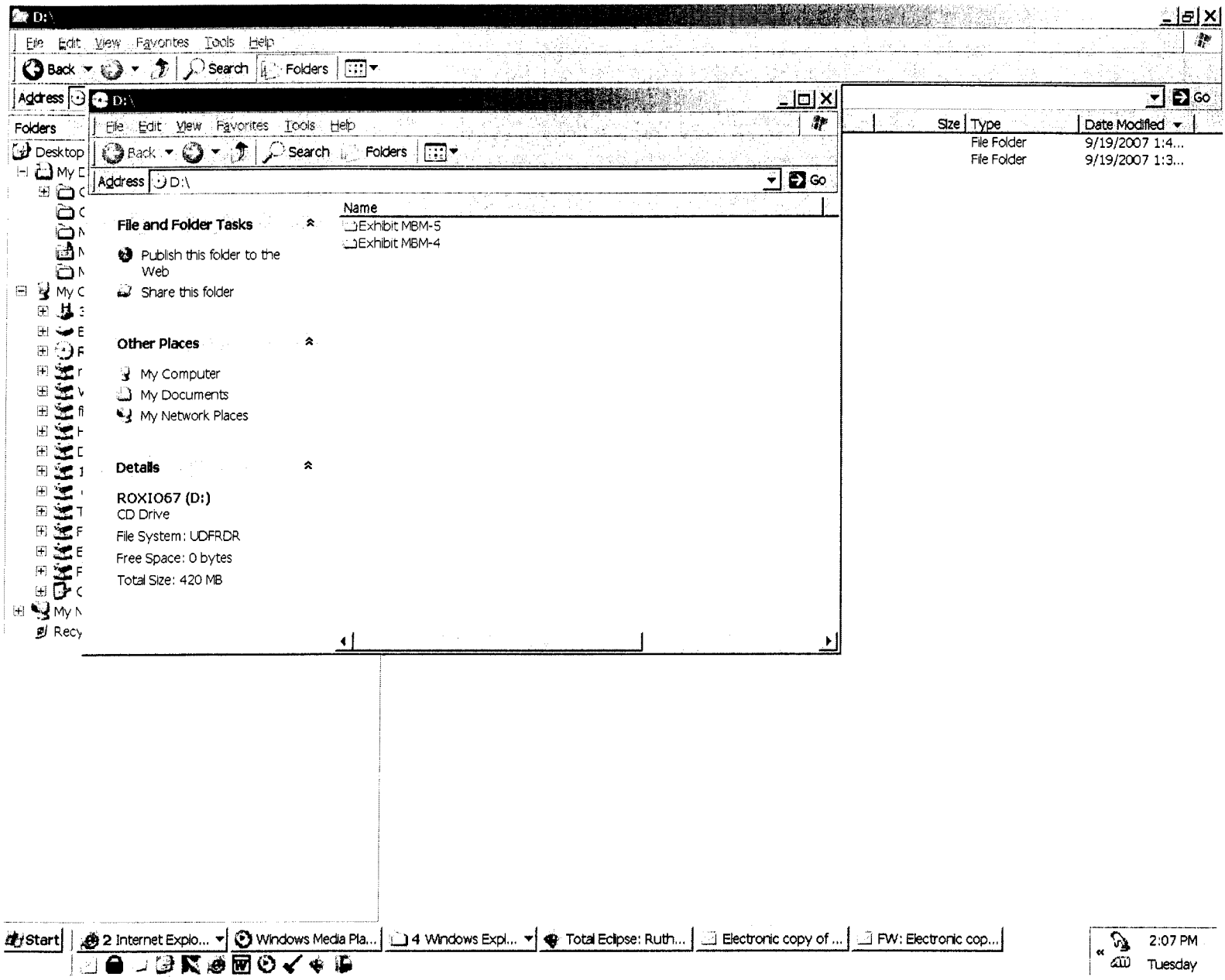

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI EXHIBIT 42
COMPANY FPL (Rebuttal)
WITNESS Manuel B. Miranda (MBM-5)
DATE 10/02-03/07

BEFORE THE FLORIDA
PUBLIC SERVICE COMMISSION

DOCKET NO. 070301-EI
FLORIDA POWER & LIGHT COMPANY

IN RE: FLORIDA POWER & LIGHT COMPANY'S 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342 F.A.C.

SEPTEMBER 14, 2007

EXHIBIT MBM-5 OF:

MANUEL B. MIRANDA

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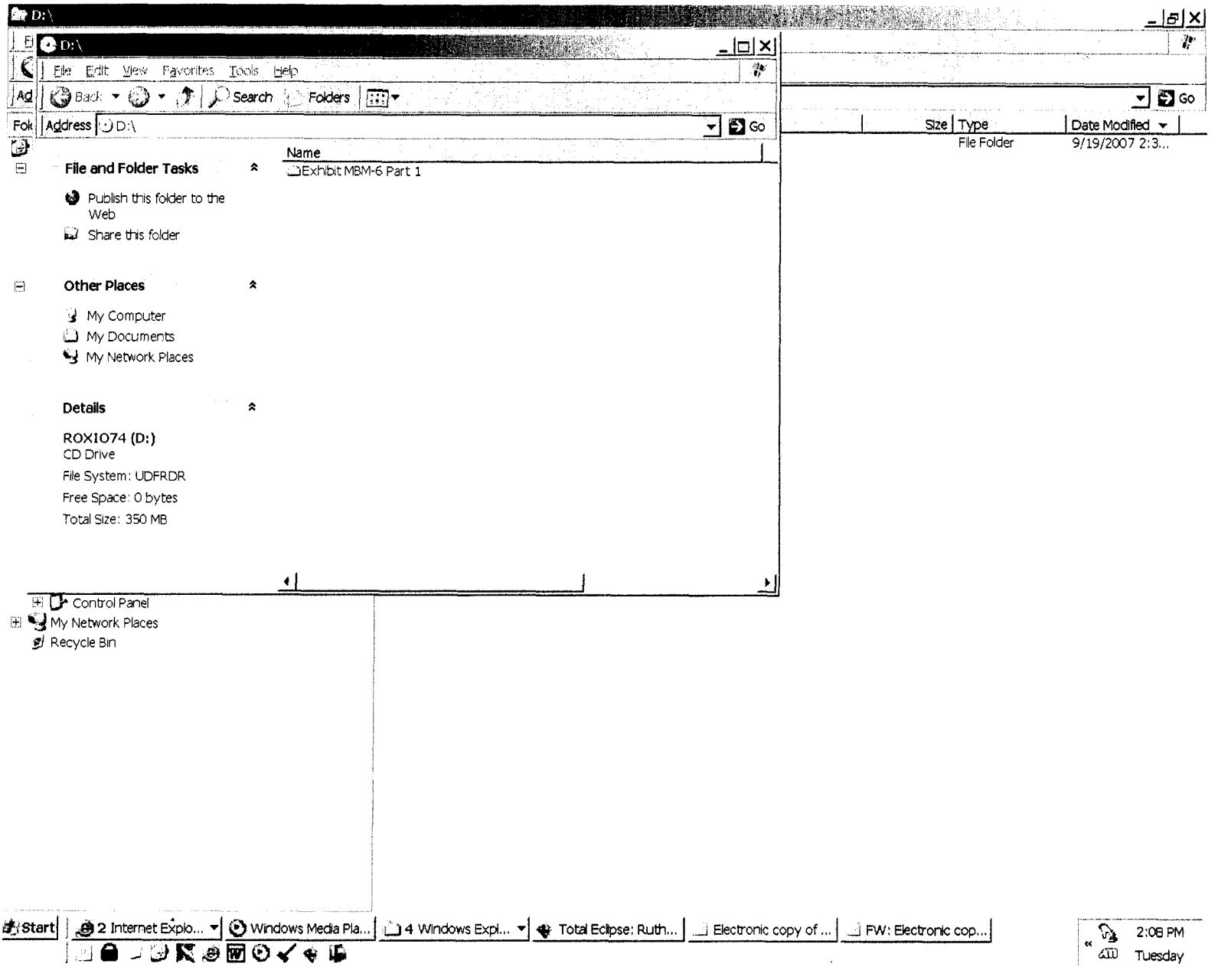

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI **EXHIBIT** 43
COMPANY FPL (Rebuttal)
WITNESS Maquel B. Miranda (MBM-6)
DATE 10/02-03/07

BEFORE THE FLORIDA
PUBLIC SERVICE COMMISSION

DOCKET NO. 070301-EI
FLORIDA POWER & LIGHT COMPANY

IN RE: FLORIDA POWER & LIGHT COMPANY'S 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342 F.A.C.

SEPTEMBER 14, 2007

EXHIBIT MBM-6, PART-1 OF:

MANUEL B. MIRANDA

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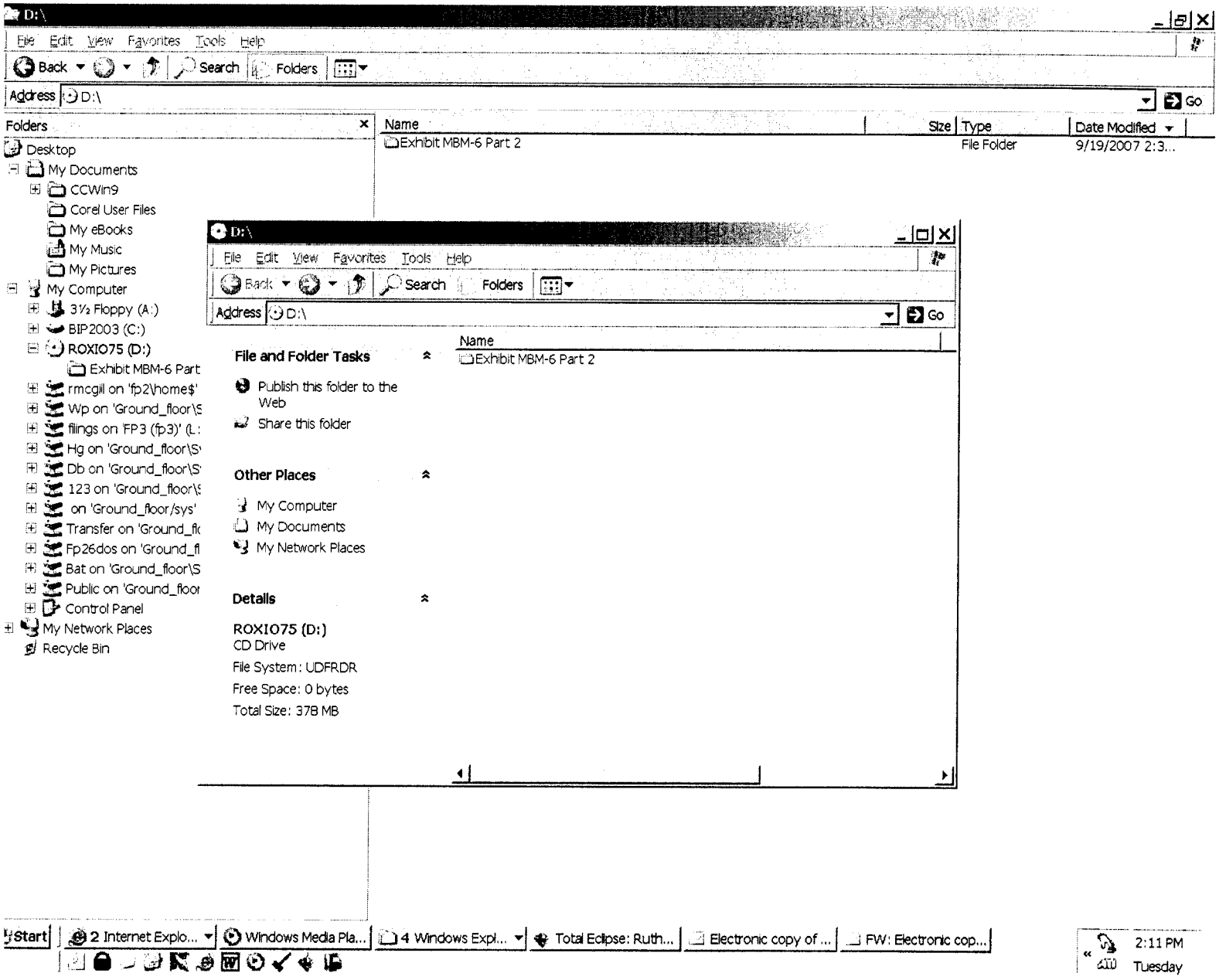
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BEFORE THE FLORIDA
PUBLIC SERVICE COMMISSION

DOCKET NO. 070301-EI
FLORIDA POWER & LIGHT COMPANY

IN RE: FLORIDA POWER & LIGHT COMPANY'S 2007 ELECTRIC INFRASTRUCTURE STORM HARDENING PLAN FILED PURSUANT TO RULE 25-6.0342 F.A.C.

SEPTEMBER 14, 2007

EXHIBIT MBM-6, PART-2 OF:

MANUEL B. MIRANDA

DOCUMENT NUMBER-DATE
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FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 07030-EI EXHIBIT 44
COMPANY FPL (Rebuttal)
WITNESS Lawrence M. Slavin, PHD, (FCTA)
DATE 10/02+03/07

EXHIBIT 44

BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Tampa Electric Company.	DOCKET NO. 070297-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Progress Energy Florida, Inc.	DOCKET NO. 070298-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company.	DOCKET NO. 070299-EI
In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Power & Light Company.	DOCKET NO. 070301-EI

COPY

TELEPHONE DEPOSITION OF:	LAWRENCE M. SLAVIN, Ph.D.
TAKEN AT THE INSTANCE OF:	Florida Power & Light Company
DATE:	September 25, 2007
TIME:	Commenced at 10:06 a.m. Concluded at 11:42 a.m.
LOCATION:	215 South Monroe Street Tallahassee, Florida
REPORTED BY:	MARY ALLEN NEEL, RPR, FPR

APPEARANCES:

REPRESENTING FLORIDA POWER & LIGHT COMPANY:

NATALIE F. SMITH, ESQUIRE
JOHN BUTLER, ESQUIRE
Florida Power & Light Company
215 South Monroe Street, Suite 810
Tallahassee, Florida 32301

REPRESENTING VERIZON FLORIDA LLC:

DULANEY L. O'ROARK III, ESQUIRE
Verizon Florida, LLC
5055 North Point Parkway
Alpharetta, Georgia 30022

REPRESENTING FCTA:

JOHN D. SEIVER, ESQUIRE
Davis Wright Tremaine, LLP
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REPRESENTING GULF POWER COMPANY:

RUSSELL A. BADDERS, ESQUIRE
Beggs & Lane
Post Office Box 12950
Pensacola, Florida 32591

REPRESENTING THE COMMISSION STAFF:

LISA C. BENNETT, ESQUIRE
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

ALSO PRESENT VIA TELEPHONE:

FRANK APP, JERRY MCMULLEN, TERRY SCOBIE, and BOB VALDEZ

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PROCEEDINGS

The following deposition was taken on oral examination, pursuant to notice, for purposes of discovery, for use as evidence, and for such other uses and purposes as may be permitted by the applicable and governing rules. Reading and signing of the deposition transcript by the witness is not waived.

* * *

Thereupon,

LAWRENCE M. SLAVIN, Ph.D.

the witness herein, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MS. SMITH:

Q. Good morning, Dr. Slavin. Again, this is Natalie Smith with the Florida Power & Light Law Department, and I'm going to be taking your deposition today.

Have you ever been deposed before?

A. Many years ago for an injury, an employee injury case.

Q. Okay. Are you familiar with the deposition process?

A. It was long enough ago that you can probably review it for me.

hassle every year. You know, we might finally have a basis for making a change, maybe, maybe not.

MS. SMITH: I don't have too many more questions. If we could take just a five-minute break, I would appreciate it.

THE WITNESS: Sure.

MR. O'ROARK: Sure.

(Short recess.)

BY MS. SMITH:

Q. Dr. Slavin, you spoke about the forensic analysis that you did for the ice storm when you were working for Telcordia. Have you done anything similar with respect to tropical storms or hurricanes?

A. No.

MS. SMITH: I have no other questions. Thank you very much.

THE WITNESS: My pleasure.

MR. SEIVER: De, this is John Seiver. I presume we're off the record for a moment.

MR. O'ROARK: Sure.

(Discussion off the record.)

CROSS-EXAMINATION

BY MR. SEIVER:

Q. Dr. Slavin, my name is John Seiver. I'm one of the co-counsel for the Florida Cable

Telecommunications Association. How are you today?

A. Fine. How are you?

Q. Good, thanks. I'm going to abide by the same rules that Ms. Smith did that if you don't understand one of my questions or something breaks up or there's static, just ask me to repeat it, or I'll have the court reporter read it back, if possible, and I'll try to rephrase it if you don't understand it. And when I ask about a document that you might have in front of you, if I direct you to a specific part of it and you need to look at something else, feel free to look at whatever you need. But I'm probably just going to ask you some quick questions about your testimony and maybe part of the KEMA report.

Dr. Slavin, I believe in your testimony you made a comment that for FP&L to go to extreme wind would be a dramatic change; is that right?

A. Yes.

Q. And it was your estimation that Florida Power & Light's proposal is based entirely on its experience with Hurricane Wilma?

A. I don't think I said entirely. I think I said largely. They also had a comment about the Davies report.

Q. Right. Okay. As far as Wilma is concerned,

as a hurricane, it was pretty unique, wasn't it?

A. Well, the results -- if the conclusions of the KEMA report are correct about wind only, it would be unique in that it was contrary from what's reported from the rest of the industry.

Q. And as far as the results, did you feel the KEMA report supported a conclusion that building to extreme wind would be effective to prevent pole failures in all future storms?

A. I did have a -- again, I don't want to take away from the effort, because it was a very comprehensive effort, and it was a very difficult job, but there are some inconsistencies that I think would undermine the conclusion, and I did refer to them on pages 26 and 27 of my testimony.

Q. I was going to ask you specifically about that, on page 26 and 27 where you quote from pages 77 and 80. In front of that, you say, "As an example of the difficulties," and this is line 11, "in attempting to arrive at a unified or consistent explanation," and you cite to these two pages and some analysis from KEMA. Do you see that?

A. Yes, I do.

Q. And do you -- what is your understanding as to why the difficulty in arriving at a unified or

consistent explanation based on the statement on page 77 that certain findings virtually eliminate the potential Grade C construction as a contributing factor?

A. Well, I try to be tactful if I can. I was trying to put it in a tactful manner. But I believe those statements -- I don't believe they were taken out of context, and I did quote them accurately. Somebody can correct me if I did miss something here. But I think this basically contradicts the whole point of what they're trying get to.

My understanding is this: They're concluding that wind only was the main cause of the problems here, and therefore, you design for wind only, which means you design your poles to be stronger. And that was in fact how they described the conclusions of the Davies report, which showed that Florida Power & Light's poles held up better than the other utilities' over the last so many storms. And that conclusion they based on Florida Power & Light in the testimony saying, "Okay. That's because we build to Grade B and the others only build to the basic rules of the NESC, which is essentially Grade C."

Okay. If true, that would be a point, but they just said that Grade B and Grade C construction didn't make a difference. What are we talking about here then, other than building stronger and helping

survive? And I think they're saying it didn't help. I may be wrong, but that's the way I interpret those two statements. And I looked at it a few times. I didn't know any other way of interpreting it.

Q. Thank you, Dr. Slavin. As far as you know, when you have trees near poles, distribution poles that are less than 60 feet, is it a generally accepted notion or understanding that regardless of grade of construction, that those trees will bring down distribution poles?

A. That's my understanding. But remember, I'm not -- I was asked before to give my analysis of technically what's happening, and I gave what I thought was happening technically. The bottom line is, we are told this by the utilities, regardless of what the actual physical mechanism for the collapse is. We are told that those distribution lines, those shorter poles are going to come down because of all those things happening. So the answer is yes, but it doesn't have to be based on my analysis. I'm basing it on the comments and experience of the industry. That's really what I'm reporting here.

Q. As far as the design factors for extreme wind for poles that are over 60 feet, are there any of those design factors that you would think are appropriate or

inappropriate if there was going to be an effort to build below 60 feet to extreme wind?

A. Yes. The NESC has different design factors or overload factors for Grade C versus Grade B even if you're above 60 feet. Even if you're above 60 feet -- they don't say anything about below 60 feet. In fact, it's exempt below 60 feet.

So if you're going to build to extreme wind for structures that are less than 60 feet, at least use those safety factors. They're not as bad as what Florida Power & Light was going to implement. In other words, they're making several dramatic steps beyond the NESC. And by building to Grade B when it's not required, okay, that's one step, and they're already doing that. Then they're going to extreme wind, which is a dramatic step. And in going to extreme wind, apparently, based on what I saw in their DERM, they're going to be using the Grade B overload factors for extreme wind, which is not required, for structures that are less than 60 feet, which is not required. That's several dramatic advances in strength requirement beyond what's basically required in the NESC.

So to answer your question, yes, if they're going to do it, whether it's in a pilot study or anything else, at least used the reduced overload

factors that are recommended in the NESC for Grade C construction. It's a .75 overload factor instead of a 1.0 overload factor.

Q. Thank you, Dr. Slavin. Also, if you're going to implement extreme wind in structures below 60 feet, would you think it reasonable to not deploy that construction standards on pole lines that are near trees?

A. If you're going to be -- that would be -- yes, that would be reasonable. I didn't address that in the testimony, but if we believe the industry comments that those trees and debris are going to take down those lines, that would not be a place where you would benefit from it at all.

But that could be part of a pilot study. You know, the pilot study could include all these categories. And if I were designing an experiment, I might want to include that just to verify that hypothesis.

Q. Dr. Slavin, would you agree if there was some evidence that concrete poles, for example, were being brought down by trees, that that would help support the conclusion not to build to extreme wind in areas close to trees?

A. Yes, I would say that would help support it.

Q. And have you looked at any distinction between using extreme wind for laterals versus feeder poles?

A. No. You know, I'm a telephone person, and I'm not 100 percent sure I have a clear definition on the laterals versus the feeder poles. So, no, I would not get into that.

Q. And when you also had testified about some of the other -- I'm not sure if you used the word "unintended," but consequences of building to extreme wind, I believe you listed things like cost, maybe more accidents.

A. Yes.

Q. Did you also include that stronger poles might make some of those accidents worse?

A. I think that might have been suggested in the terminology. I think I might have said more accidents or more serious incidents. I think that might have been one of the words I had there.

Q. If there were evidence in a utility's history of pole claims that the prevalence of car accidents or the presence of car accidents was a dominant factor, do you think that would help indicate not using extreme wind, at least for those poles that are clear or near a right-of-way?

A. I'm sorry. Can you repeat the question again?

Q. I know I had a lot going on there. I'm sorry.

A. Yes. Repeat it again.

Q. If you have a utility that has a history that demonstrates that the majority of pole accidents are from car accidents, that you should not build stronger, extreme wind poles in areas that are likely to be traversed by automobile traffic?

A. That could be an additional hazard. I would say, again, if you're doing a pilot program, let's not at least endanger the public when we're doing it. So I would pick a spot, you know, where maybe that wasn't going to be one of the bad consequences. We don't want the public to suffer from this while we're trying to learn.

MR. SEIVER: Well, I think that's all I have for you, Dr. Slavin. I appreciate your time.

THE WITNESS: No problem.

MR. O'ROARK: This is De O'Roark. Are there any further questions? I do not have any.

May we go off the record?

MS. SMITH: Yes.

(Deposition concluded at 11:42 a.m.)

CERTIFICATE OF REPORTER

STATE OF FLORIDA:

COUNTY OF LEON:

I, MARY ALLEN NEEL, Registered Professional Reporter, do hereby certify that the foregoing proceedings were taken before me at the time and place therein designated; that a review of the transcript was requested; that my shorthand notes were thereafter translated under my supervision; and that the foregoing pages numbered 1 through 69 are a true and correct record of the aforesaid proceedings.

I FURTHER CERTIFY that I am not a relative, employee, attorney or counsel of any of the parties, nor relative or employee of such attorney or counsel, or financially interested in the foregoing action.

DATED THIS 27th day of September, 2007.

MARY ALLEN NEEL, RPR, FPR
2894-A Remington Green Lane
Tallahassee, Florida 32308
(850) 878-2221

CERTIFICATE OF OATH

STATE OF FLORIDA

COUNTY OF HILLSBOROUGH

I, the undersigned authority, certify that Dr. Lawrence Slavin personally appeared before me at Tampa, Florida and was duly sworn by me to tell the truth.

WITNESS my hand and official seal in the City of Tampa, County of Hillsborough, State of Florida, this 25th day of September, 2007.

Teresa Ann Scobie
Notary Public
State of Florida

Personally known X or produced identification_____

Type of identification produced_____

Mary A. Neel

From: "Mary Neel" <maneel@comcast.net>
To: <de.oroark@verizon.com>
Cc: <Natalie_Smith@fpl.com>; <John_Butler@fpl.com>; <johnseiver@dwt.com>
Sent: Friday, September 28, 2007 10:07 AM
Attach: Errata Sheet.doc; 092507.pdf; 092507.txt
Subject: Docket No. 070297-EI

Attached are ASCII and PDF formats of the transcript of the deposition of Dr. Lawrence Slavin
taken in the above matter on 09/25/07. Also attached is a Word format errata sheet. Please have Dr. Slavin read his deposition and complete the errata sheet and forward it to all counsel.

If this is not done within 15 days, reading and signing may be deemed waived under the Florida Rules of Civil Procedure. If you have any questions, please call our office at 850.878.2221.

Thank you for your cooperation in this matter.

Regards,

Mary A. Neel
Accurate Stenotype Reporters
850.878.2221.x633
www.accuratestenotype.com

ERRATA SHEET

Under penalties of perjury, I declare that have read the foregoing transcript of my deposition, pages 1 through 70, and that the facts stated therein a true, including any corrections and/or amendments listed below.

10/1/2007
Date

LAWRENCE M. SLAVIN

Page	Line	Correction or Amendment	Reason for Change
12	12	"the ability to "	TYPO
15	22	"proposals based upon different perspectives, of the same"	TYPO/CLARIFICATION
17	10	"address the issues, in addition to making the document "	TYPO/CLARIFICATION
18	6	"go in by JULY 17, 2008, and its not"	CLARIFICATION/CORRECTION
29	22	"preprint, an eight-month period"	CORRECTION
33	20	SEE public comment CM4007	LATER RECOLLECTION
49	4	"stronger poks, or more poles"	TYPO

Deposition taken on 09/25/07, Docket No. 070297-EI, et seq.

DOCKET NO. 070299-EI
GULF POWER COMPANY'S STORM HARDENING PLAN

CROSS-EXAMINATION EXHIBIT 45

GULF POWER'S RESPONSES TO PCB INTERROGATORIES 41-47

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI EXHIBIT 45
COMPANY FPL (Rebuttal)
WITNESS Edward J. Battaglia (PCB/MUNC)
DATE 10/02 & 03/07

41. Does Gulf agree that there are benefits, e.g., storm restoration cost savings, vegetation management cost savings, avoided pole inspection costs, or any other benefits, of undergrounding defined geographical areas that accrue to the general body of ratepayers who reside outside of the specific areas where the underground construction is made?

ANSWER:

Gulf has not performed any reviews using available or "hypothetical" data which would support this assumption. Undergrounding a large area where there is no threat of a storm surge but is highly susceptible to damage from wind blown debris may provide benefit to the general body of ratepayers but there is no definitive proof and the associated maintenance costs must be included in the analysis. Currently Gulf has joined with its industry peers in a PURC evaluation of this question in order to determine the actual savings received from the replacement of overhead lines with underground. Gulf's position is that until that study is completed we can not agree with this assumption.

42. Has Gulf developed a methodology for calculating the benefits, e.g., storm restoration cost savings, vegetation management cost savings, avoided pole inspection costs, or any other benefits, of undergrounding defined geographical areas that accrue to the general body of ratepayers who reside outside of the specific areas where the underground construction is made?

ANSWER:

Gulf's analysis is based on Gulf's years of electric system operation, storm restoration experience and available weather data.

Gulf's experience is that operations and maintenance related to underground distribution facilities is greater than that associated with overhead facilities. In addition, Gulf's experiences with underground facilities in many coastal areas show that it not possible to design underground systems to withstand storm surges related to major storm activity.

In its Forensic data gathering process, Gulf has used its operation and storm restoration experience to determine those data items. As this data becomes available, Gulf will evaluate potential benefits and costs related to undergrounding.

Further, Gulf has joined with its industry peers in a PURC evaluation of undergrounding.

2, 14

43. Has Gulf developed a methodology for calculating the costs, e.g., construction costs and any additional operation and maintenance costs, and benefits, e.g., storm restoration cost savings, vegetation management cost savings, avoided pole inspection costs, or any other benefits, of undergrounding as a technique or technology for "hardening" electrical distribution facilities? If so, please identify such methodology, and identify and provide any documents reflecting such methodology.

ANSWER:

Please see response to Interrogatory No. 42.

44. Has Gulf developed a methodology for calculating the costs, e.g., construction costs and any additional operation and maintenance costs, and benefits, e.g., storm restoration cost savings, vegetation management cost savings, avoided pole inspection costs, or any other benefits, associated with any technique or technology for "hardening" electrical distribution facilities, whether overhead or underground? If so, please identify such methodology, and identify and provide any documents reflecting such methodology.

ANSWER:

Gulf's analysis is based on Gulf's years of electric system operation, storm restoration experience and available weather data.

Gulf's experience is that operations and maintenance related to underground distribution facilities is greater than that associated with overhead facilities. In addition, Gulf's experiences with underground facilities in many coastal areas show that it is not possible to design underground systems to withstand storm surges related to major storm activity.

In its Forensic data gathering process, Gulf has used its operation and storm restoration experience to determine those data items to collect. As this data becomes available, Gulf will evaluate potential benefits and costs related to undergrounding.

Further, Gulf has joined with its industry peers in a PURC evaluation of undergrounding.

The attached document, developed by Gulf, proposes a methodology for determining Gulf power's overhead estimated benefits for storm restoration costs and impact on storm caused outages and the other is Gulf's Vegetation Management Plan methodology for calculating benefits.

Calculation Methodology for determining Gulf Power's OH Estimated Benefits for Storm Restoration costs and Impact on Storm Caused Outages
7-23-07

Storm outage avoidance is calculated using the following assumptions and information from the following data sources:

- March 1, 2006 filing for "Reliability and Storm Hardening Initiatives Report".
- Pole losses are based on Gulf's worst hurricane to date, which was Ivan, a Category 3 storm in 2004.
- Based on 155 years of NOAA weather data, Gulf has experienced approximately 80% Cat 1 & 2 and approximately 20% Cat 3 storms during this time period.

Every attempt has been made to use available data, experience and reasonable judgment to determine these benefits.

The total cost benefit picture is derived by modeling two scenarios, one for feeder pole losses and one for lateral pole losses.

The first scenario is based on loss of a pole within a major feeder, and the outage time used is based on vehicle caused outage average for three years. Vehicle caused outage is used because it most closely resembles the complicated conditions encountered during a storm caused pole loss. The outage time or repair time used is based on the vehicle caused 5 year L-Bar Average.

Number of Distribution Feeders	267
Total Gulf customer as of 12/31/06	418, 892
Average customers per feeder	1,569
Average time (minutes) to repair feeder pole	155
Average cost to repair	$1,820
Assumed feeder pole failures	1,066
Avoided CMI for feeder poles = 155	165,230
Avoided repair cost for feeder poles	$1,940,120

The second scenario is based on loss of a pole within a feeder lateral. The outage time used is based on one-half the vehicle caused 5 year L-Bar Average.

Number of Distribution laterals for estimating purposes assumed 1 major lateral per feeder	267
Total Gulf customers on laterals as of 12/31/06 is	259,976
Average customers per lateral	974
Average time to repair lateral pole (assume half of feeder time)	78
Average cost to repair	$1,820
Assumed lateral pole failures	1,764
Avoided CMI for lateral poles = 78	137,592
Avoided repair cost for lateral poles	$3,210,480

Based on the above two scenarios, the expected Total Benefits for a Major Storm Year are estimated to be:

	Avoided CMI	Avoided Costs
Scenario 1 - Feeders	165,230	$1,940,120
Scenario 2 - Laterals	137,592	$3,210,480
Total Benefits	302,822	$5,150,600

Gulf cannot predict what frequency and Category of storms it may experience in the future. Therefore, what portion of these benefits it may experience each year, is not known.

As shown in the chart below, Gulf experienced major storms during the 155 year NOAA weather data, of Category 3 level, 22% of the time.

Area	CAT 1 Winds 74-94 mph	CAT 2 Winds 96-110 mph	CAT 3 Winds 111-130 mph	CAT 4 Winds 131-155 mph	CAT 5 Winds >155 mph	ALL	Major Hurricanes
NW Florida	27	16	12	0	0	55	12
Percentage of Total	49%	29%	22%	0%	0%	-	22%

Based on this frequency rate, the possible expected Total Benefits for a Major Storm Year are estimated to be:

	Avoided CMI	Avoided Costs
Benefits	302,822	$5,150,600
Cat 3	Times 22%	Times 22%
Based on Storm Frequency	66,621	$1,133,132

VEGETATION MANAGEMENT FOR STORM HARDENING

In accordance with Order No. PSC-060351, Gulf Power has assessed the feasibility of a three-year vegetation management cycle and is proposing an alternative approach to hardening the distribution system against future storm caused outages.

Gulf Power proposes to incorporate additional enhancements to its present reliability based program to improve the program's performance in relation to hardening the distribution system against future storms while continuing to insure day to day reliability of the system. These program enhancements will enable Gulf Power to establish a cyclical approach to segments of its vegetation management program while retaining the flexibility necessary to target resources on the areas where the greatest cost benefit will be recognized.

Gulf is recommending a program which will consist of the following items.

INCREMENTAL PROGRAM ELEMENTS

- A three-year trim cycle on all main line feeders
- An annual inspection and corrective action program for main line feeders not treated by cyclical or other work types
- A program for removing hazard trees located outside the normally maintained pruning zone with heavy emphasis placed on main line feeders
- Increased storm hardening of new distribution lines by modifying initial vegetation clearing practices during construction
- Local coordination with code enforcement officials where customer owned trees threaten Gulf's facilities but the customer refuses to assist in remediation of the problem
- Forensic forestry following storms
- Public education

NON INCREMENTAL PROGRAM ELEMENTS

- A reliability based management program for all laterals which will achieve a maximum cycle of six years

This program will achieve an effective cycle of less than three-years and will expand the scope of Gulf's normal vegetation management program by addressing trees located outside the normally maintained pruning zone which pose a threat to the distribution system under storm conditions.

	Miles Treated	Cycle (Yrs.)
FPSC Recommended Plan	1,942	3
Gulf's Recommended Plan		
- 3 yr. cycle on main line feeders	615	3
- Annual inspection w/ corrective pruning	1,230	1
- Removal of hazard trees	200 - 400	N/A
- Reliability based management of laterals (6 yr. maximum cycle)	663	6
TOTAL GULF RECOMMENDED PROGRAM	**2,508 *** * Total does not include any mileage for hazard tree removal to prevent double counting miles	**2.3**

Through this program, Gulf will insure main line feeders are inspected annually and pruned on a cyclical basis. Laterals will still be managed on a reliability based methodology but Gulf will manage the program to insure a maximum cycle of 6 years is maintained on the laterals.

ROUTINE MAINTENANCE IMPACTS

Vegetation on main line feeders will be maintained on a three-year cycle. Each year, one third of the main line feeders will be systematically pruned, while the remaining two-thirds are either inspected with follow-up pruning to correct deficiencies, or inspected and worked for hazard tree removal. This will focus program resources on the area where tree caused outages have the greatest impact. Tree caused outages on main feeders account for 49% of vegetation caused customer interruptions with an average CI of 1,305 per outage.

Laterals will be managed through the use of reliability based vegetation management. Circuits will be categorized based on tree caused outages and customer density. Field inspections will determine the amount and type of vegetation management needed to improve reliability. This program will maintain the flexibility to allow work on heavily forested areas that are experiencing reliability issues more frequently than sparsely forested areas where reliability is acceptable.

In addition, work on laterals will be documented so areas that do not present themselves as reliability problem areas can be scheduled for inspection and follow up corrective work. In the past, laterals which did not present themselves as problem areas due to low tree caused outage rates may have not received any inspection or corrective work. This approach will provide a safety net by insuring that every lateral is either pruned, or inspected with follow-up corrective action a minimum of once every 6-years. This component of its management of vegetation on laterals represents an incremental program addition to Gulf's past reliability based management on laterals.

With regard to day to day reliability of the system, this approach will also provide greater cost benefit since it is designed to reduce the number of outages which result in high customer interruptions.

	Annual Incremental Cost	Avoided Annual CI	Annual Cost Per Avoided CI
FPSC Recommended Program	$4,200,000	28,395	$148
Gulf Recommended Program	$1,500,000	23,005	$65

Gulf will also incorporate an education component into its proposed program. Educational material on planting trees to avoid power outages will be developed and made available to our customers. Gulf will also work closely with the municipalities it serves to educate public officials on the need for hazard tree removal and overall management of street trees with a goal of reducing storm damage to power lines and other public infrastructure.

STORM HARDENING IMPACTS

In addition to its normal maintenance of existing lines, Gulf will incorporate a hazard tree program to address trees located outside the normally maintained and established pruning zone. As noted in earlier filings, most of Gulf's vegetation caused storm outages result from off right-of-way trees falling into its facilities. Gulf will work in cooperation with local municipalities and customers to facilitate the removal of the trees or large overhanging limbs to insure they no longer present a threat to Gulf's facilities. Since it is impractical to remove all trees that have the potential to fall into Gulf's lines, trees will be prioritized based on the level of threat they impose and will focus on the highest threat first. Gulf will prioritize its distribution feeders based on customer density, forest type, and tree cause outage data. Gulf will inspect the main line feeders on a priority basis. Initially, trees that pose an imminent threat to high priority circuits will be addressed. Heavy emphasis will be placed on main line feeder sections but the program may also treat high priority laterals feeding critical infrastructure such as sewage lift stations.

A large majority of Gulf's distribution lines are on franchise roadside easements and hazard trees are normally on private property where Gulf does not have pruning rights. In those cases where a tree presents

an imminent threat to its facilities but the owner refuses to allow corrective action, Gulf will work cooperatively with local code enforcement officials to insure every effort is made to remediate the threat.

Gulf will also modify its initial clearing of right-of-way for new overhead construction. In the past, Gulf has focused its clearing activities to the franchise granted portion of the easement. In the future, Gulf will incorporate the removal of hazard trees outside the normally established and maintained right-of-way when initially clearing for new lines. This will insure the hardening of all new lines from the day they are built. This activity will impact between twenty and thirty miles of new overhead line each year.

With regard to cost and storm outage avoidance, this program compares to the PSC recommended program as follows:

	Annual Incremental Cost	Storm Outage Avoidance Per Event in Year 1 (CMI)
FPCS Recommended Program	$4.2 million	0 (See outage calculation assumptions)
Gulf Power Recommended Program	$1.5 million	4,000,000 to 40,000,000

Storm outage avoidance is calculated using the following assumptions:

Number of distribution feeders on system	277
Total Gulf Customers	408,641
Average customers per feeder	1,475
Average time to remove failed tree	60
Average cost per hazard tree removal	$300
Trees removed per year	5,000
Assume 1% of removals are avoided outages	50
Avoided CMI @ 1% = 50*60*1,475	4,425,000
Assume 10% avoided outage rate	500
Avoided CMI @ 10% = 500*60*1,475	44,250,000

Every attempt has been made to show a very conservative estimate of avoided outage time and to show the incremental improvement in outage reduction. Gulf acknowledges a three-year cycle would prevent some tree caused outages in storm conditions. Gulf also recognizes its recommended cyclical and reliability based program would also prevent some outages. Therefore, Gulf did not assume any storm outage reduction from cyclical or reliability based pruning within the normally maintained portion of the right-of-way for either program. Zero was used as a basis of comparison to show the incremental improvement in outage reduction provided by the proposed hazard tree program.

CMI was used instead of CI for storm related outage reduction. Under storm condition, a feeder may have multiple trees down, so an avoided failure may not prevent an outage from occurring somewhere else on the feeder. However, by reducing the number of failed trees that require removal from Gulf's lines, CMI will be significantly improved.

The removal of hazard trees will have a cumulative positive effect on outage avoidance in subsequent years. Trees removed during year one will continue to represent an avoided outage in year five of the program whereas trees that are pruned on a cyclical basis will grow back and once again represent a potential outage. While the program may have less impact in its early stages, the positive impacts will be significant in future years as the number of hazard tree removals continues to increase.

Avoidance Rate	Year 1 Avoided CMI	Year 2 Avoided CMI	Year 3 Avoided CMI	Year 4 Avoided CMI	Year 5 Avoided CMI
1%	4,425,000	8,850,000	13,275,000	17.700.000	22,125,000
10%	44,250,000	88,500,000	132,750,000	177,000,000	221,250,000

Considered in the context of Hurricanes Ivan and Dennis, this would have resulted in a 20% reduction in CMI for Dennis and 7% for Ivan during year 5 of the program.

This program will also provide an improvement in the day to day reliability of its distribution system. While data does not exist to allow a full analysis of the impact, there are indications that a minimum of 15% of Gulf main line feeder interruptions under normal day-to-day operation were caused by tree failures outside the pruning zone.

In order to refine the selection of hazard trees, Gulf will employ the use of forensic foresters in future storms to analyze tree caused outages. Tree failures will be analyzed to insure the trees being selected for removal fit the characteristics of actual tree failures.

PROGRAM EVALUATION

Gulf will evaluate the overall program on an annual basis through the analysis of annual reliability data and forensic data collected following storms. In addition, Gulf will monitor vegetation management related research activities for possible program improvements.

45. Please identify and provide copies of any benefit-cost studies or analyses of overhead vs. underground distribution facilities prepared by or for Gulf, whether for Gulf alone or for Gulf as part of a larger system or group of utilities, within the past 10 years.

ANSWER:

Gulf's analysis is based on Gulf's years of electric system operation, storm restoration experience and available weather data.

Gulf's experience is that operations and maintenance related to underground distribution facilities is greater than that associated with overhead facilities. In addition, Gulf's experiences with underground facilities in many coastal areas show that it is not possible to design underground systems to withstand storm surges related to major storm activity.

In its Forensic data gathering process, Gulf has used its operation and storm restoration experience to determine those data items to collect. As this data becomes available, Gulf will evaluate potential benefits and costs related to undergrounding.

Further, Gulf has joined with its industry peers in a PURC evaluation of undergrounding.

46. Please identify and provide copies of any benefit-cost studies or analyses of overhead distribution facilities constructed to different standards, e.g., to NESC Grade C construction standards vs. NESC Extreme Wind Loading criteria, prepared by or for Gulf, whether for Gulf alone or for Gulf as part of a larger system or group of utilities, within the past 10 years.

ANSWER:

The attached document, developed by Gulf, proposes a methodology for determining Gulf Power's overhead estimated benefits for storm restoration costs and impact on storm caused outages.

Calculation Methodology for determining Gulf Power's OH Estimated Benefits for Storm Restoration costs and Impact on Storm Caused Outages
7-23-07

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Number of Distribution Feeders	267
Total Gulf customer as of 12/31/06	418, 892
Average customers per feeder	1,569
Average time (minutes) to repair feeder pole	155
Average cost to repair	$1,820
Assumed feeder pole failures	1,066
Avoided CMI for feeder poles = 155	165,230
Avoided repair cost for feeder poles	$1,940,120

The second scenario is based on loss of a pole within a feeder lateral. The outage time used is based on one-half the vehicle caused 5 year L-Bar Average.

Number of Distribution laterals for estimating purposes	
assumed 1 major lateral per feeder	267
Total Gulf customers on laterals as of 12/31/06 is	259,976
Average customers per lateral	974
Average time to repair lateral pole (assume half of feeder time)	78
Average cost to repair	$1,820
Assumed lateral pole failures	1,764
Avoided CMI for lateral poles = 78	137,592
Avoided repair cost for lateral poles	$3,210,480

Based on the above two scenarios, the expected Total Benefits for a Major Storm Year are estimated to be:

	Avoided CMI	Avoided Costs
Scenario 1 - Feeders	165,230	$1,940,120
Scenario 2 - Laterals	137,592	$3,210,480
Total Benefits	302,822	$5,150,600

Gulf cannot predict what frequency and Category of storms it may experience in the future. Therefore, what portion of these benefits it may experience each year, is not known.

As shown in the chart below, Gulf experienced major storms during the 155 year NOAA weather data, of Category 3 level, 22% of the time.

Area	CAT 1 Winds 74-94 mph	CAT 2 Winds 96-110 mph	CAT 3 Winds 111-130 mph	CAT 4 Winds 131-155 mph	CAT 5 Winds >155 mph	ALL	Major Hurricanes
NW Florida	27	16	12	0	0	55	12
Percentage of Total	49%	29%	22%	0%	0%	-	22%

Based on this frequency rate, the possible expected Total Benefits for a Major Storm Year are estimated to be:

	Avoided CMI	Avoided Costs
Benefits	302,822	$5,150,600
Cat 3	Times 22%	Times 22%
Based on Storm Frequency	66,621	$1,133,132

47. Please identify and provide copies of any studies or analyses prepared by or for Gulf within the past 10 years that address the practicability, feasibility, costs and benefits, or cost-effectiveness, or any or all of these in any combination, of:

a. overhead facilities constructed to meet Gulf's current construction standards vs. overhead facilities constructed to meet standards that would meet the NESC extreme wind loading criteria;

b. overhead facilities constructed to meet Gulf's current construction standards vs. overhead facilities constructed to meet Saffir-Simpson Category 4 or Category 5 tropical cyclone wind speeds; and

c. overhead facilities, constructed to any standards, vs. underground facilities.

ANSWER:

a. The attached document, developed by Gulf, proposes a methodology for determining Gulf Power's overhead estimated benefits for storm restoration costs and impact on storm caused outages.

Calculation Methodology for determining Gulf Power's OH Estimated Benefits for Storm Restoration costs and Impact on Storm Caused Outages
7-23-07

Storm outage avoidance is calculated using the following assumptions and information from the following data sources:

- March 1, 2006 filing for "Reliability and Storm Hardening Initiatives Report".
- Pole losses are based on Gulf's worst hurricane to date, which was Ivan, a Category 3 storm in 2004.
- Based on 155 years of NOAA weather data, Gulf has experienced approximately 80% Cat 1 & 2 and approximately 20% Cat 3 storms during this time period.

Every attempt has been made to use available data, experience and reasonable judgment to determine these benefits.

The total cost benefit picture is derived by modeling two scenarios, one for feeder pole losses and one for lateral pole losses.

The first scenario is based on loss of a pole within a major feeder, and the outage time used is based on vehicle caused outage average for three years. Vehicle caused outage is used because it most closely resembles the complicated conditions encountered during a storm caused pole loss. The outage time or repair time used is based on the vehicle caused 5 year L-Bar Average.

Number of Distribution Feeders	267
Total Gulf customer as of 12/31/06	418, 892
Average customers per feeder	1,569
Average time (minutes) to repair feeder pole	155
Average cost to repair	$1,820
Assumed feeder pole failures	1,066
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Percentage of Total	49%	29%	22%	0%	0%	-	22%

Based on this frequency rate, the possible expected Total Benefits for a Major Storm Year are estimated to be:

	Avoided CMI	Avoided Costs
Benefits	302,822	$5,150,600
Cat 3	Times 22%	Times 22%
Based on Storm Frequency	66,621	$1,133,132

b. Please see response to part a. As shown in the analysis, historical weather information shows that it would not be cost effective to design for Hurricanes of Category 4 or 5 based on no history of storms of this magnitude impacting Gulf's service area. In addition, as the National Oceanic and Atmospheric Administration states "the amount of damage (at least experienced along the U.S. mainland) does not increase linearly with the wind speed. Instead, the damage produced increases exponentially with the winds." This again supports that designing for these levels of storms as being non-cost effective.

c. Gulf's analysis is based on Gulf's years of electric system operation, storm restoration experience and available weather data.

Gulf's experience is that operations and maintenance related to underground distribution facilities is greater than that associated with overhead facilities. In addition, Gulf's experiences with underground facilities in many coastal areas show that it is not possible to design underground systems to withstand storm surges related to major storm activity.

In its Forensic data gathering process, Gulf has used its operation and storm restoration experience to determine those data items to collect. As this data becomes available, Gulf will evaluate potential benefits and costs related to undergrounding.

Further, Gulf has joined with its industry peers in a PURC evaluation of undergrounding.

AFFIDAVIT

STATE OF FLORIDA)
)
COUNTY OF ESCAMBIA)

Docket No. 070299-EI

Before me the undersigned authority, personally appeared Susan D. Ritenour, Secretary and Treasurer and Regulatory Manager of Gulf Power Company, and who on behalf of said corporation, being first duly sworn, deposes and says that pursuant to Rule 1.340(a), Florida Rules of Civil Procedure, she verifies that the foregoing answers to the interrogatories are submitted on behalf of said corporation, and that the foregoing constitute true and correct answers to the best of her knowledge, information, and belief based on the information provided by others in the course of business. She is personally known to me.

Susan D. Ritenour

Susan D. Ritenour
Secretary and Treasurer and Regulatory Manager

Sworn to and subscribed before me this 2ND day of August, 2007.

Brame Nye Holsinger

Notary Public, State of Florida at Large

BRAME NYE HOLSINGER
MY COMMISSION # DD 401210
EXPIRES: April 10, 2009
Bonded Thru Notary Public Underwriters

DOCKET NO. 070301-EI
FLORIDA POWER & LIGHT COMPANY'S STORM HARDENING PLAN

CROSS-EXAMINATION EXHIBIT 46

FPL'S STORM SECURE PLAN, JANUARY 30, 2006

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI EXHIBIT 46
COMPANY FPL (Rebuttal)
WITNESS Edward J. Battaglia (PCB/MUC)
DATE 10/02 & 03/07

STORM SECURE: FPL'S FIVE-POINT PLAN TO BUILD A STRONGER GRID FOR THE FUTURE

January 30, 2006

The purpose of this paper is two-fold: to explain the steps that FPL proposes to take to substantially increase the resistance of its distribution, transmission and substation network to severe weather impacts; and to identify areas where assistance will be required, either from the Florida Public Service Commission (FPSC) or from state and local government bodies and communities.

BACKGROUND

Two extraordinary hurricane seasons have made it clear that significant changes are required in the way that Florida utilities design, construct and operate their electrical systems. This is particularly true for FPL, whose service area has experienced the direct hit of five hurricanes as well as the impact of two others in 2004 and 2005. Standards that have worked well and provided customers with reliable service in the past will need to be enhanced going forward. Florida generally, and South Florida in particular, are much more heavily and densely populated than they were at the time of Hurricane Andrew; customers' expectations have changed; and there is good evidence that we are in a more active part of a multi-decade hurricane cycle and can expect more frequent events. Even if 2004 and 2005 were aberrations, as long-term statistics suggest, we must be prepared for further, significant storm activity in the years ahead.

The issue is not whether changes should be made, but what those changes should be. Although no electrical system can be rendered fully resistant to hurricane impacts under the current state of technology and economics, this paper outlines changes that FPL proposes to make to benefit our customers and the communities we serve. Our approach to new construction, system upgrades and maintenance will provide significant improvements in our system's resiliency to storms and our restoration time after a storm passes. In addition, it will ensure that a critical mass of providers of basic services that are essential to the health and safety of our communities will have a reliable supply of electricity as promptly as possible after a hurricane strike. In developing these proposals, some of which will require FPSC approval, we have kept in mind the following essential points:

1. FPL's distribution, transmission and substation systems, as validated by KEMA's independent analysis, meet or exceed all required safety standards set forth by the National Electrical Safety Code (NESC) and performed as designed and expected during recent hurricanes. However, given the severe nature of the 2004 and 2005 hurricane seasons and, as the FPSC has recognized, the fact that meteorological experts have determined that this is likely part of a long term cycle of increased hurricane activity, we are proposing many changes to the current standards for our distribution system.

2. Significant changes to the resiliency of our system will take many years of sustained effort to achieve. Unfortunately, our system is so large and geographically diverse that it cannot be changed overnight, and all parts of our extensive service territory are susceptible to hurricane impacts. Therefore, we must be intelligent in the development of our programs and focus early efforts on those parts of the system where we can have the greatest impact for a given level of effort, whether this be by geography or by element of the network.

3. Substantial improvements to our system's resiliency will have cost implications (for example, converting the entire grid to underground could double our customers' rates). We know that would be unacceptable to most customers. That is why we must focus on spending resources efficiently and wisely.

4. We must avoid focusing excessively on any one aspect of the problem. Electrical systems are exposed to a variety of different failure modes under the stress of hurricane conditions and typically each specific failure mode only accounts for a relatively small proportion of the total problem. For example, FPL and every other utility experiences pole failures during hurricane conditions. However, even if FPL had experienced zero pole failures during the 2004 and 2005 storm seasons, we would still have experienced millions of customer outages.

We have used these points as guidelines in assisting us to formulate the initiatives that follow and in their refinement in the coming months.

BASIS OF OUR PROPOSALS

We have developed our proposals based in part on the extensive analyses that we have conducted either directly ourselves, or with the aid of external resources such as KEMA, on the evidence of seven hurricane events that our system has experienced in the last two seasons: Charley, Frances, Jeanne, Dennis, Katrina, Rita and Wilma, [1] and also taking into consideration customer and governmental expectations that have been expressed in the wake of this past storm

[1] FPL Hurricane Assessment prepared by Davies Consulting, Inc. (February 18, 2005); FPL Transmission and Substation – 2004 Storm Season Report (2005); FPL Hurricane Assessment (January 25, 2005); FPL Infrastructure Resilience Team Report on 2004 Hurricanes (2005); FPL Vegetation Management Study (2005); FPL Wilma Engineering Analysis prepared by KEMA (January 12, 2006).

season. We are happy to provide further background to the Commission and its Staff. However, we note that we have not by any means completed our analysis and we expect to learn more as we continue to probe the evidence. In addition, while our proposals have been subjected to a preliminary and general economic assessment, we are not yet at the point where we can specify exactly what each element of the program will cost. Accordingly, we expect to refine our proposed program over time, both by adding elements as we develop new ideas and by adjusting the timing, level or focus of current elements. FPL is committed to the approach and initiatives set forth in this paper, subject to FPSC review and approval where needed.

ELEMENTS OF THE PLAN

1. Complete **post-hurricane repairs and targeted facility upgrades** to rehabilitate and strengthen the electrical infrastructure in order to prepare for the 2006 hurricane season.

2. Modify our existing **pole inspection, treatment and replacement** program to include a systematic ten-year inspection and treatment cycle for all distribution wood poles, including those poles owned by other utilities, in order to proactively address any identified pole deficiencies (consistent with recent FPSC staff recommendations) and work with other utilities to address joint use issues pertaining to loading.

3. **Harden the electrical infrastructure** by (a) adopting NESC extreme wind velocity zone criteria as the standard for all new distribution construction and system upgrades (up to 150 mph in certain areas) using construction methods such as undergrounding, stronger poles (including concrete poles where appropriate), shorter spans, guying, etc., (b) upgrading existing overhead main lines (feeders) initially targeting those serving top critical infrastructure facilities and major thoroughfares within the first five years, with the objective of applying NESC extreme wind-loading criteria where feasible and practical, and (c) replacing targeted components of remaining transmission and substation facilities constructed under legacy standards -- all as part of a comprehensive, detailed ten-year hardening plan for distribution, transmission and substation infrastructure.

4. Promote **undergrounding** by (a) investing 25% of the cost of local-government sponsored overhead-to-underground conversion projects otherwise borne by the requesting locality, (b) aggressively encouraging local ordinances and legislation requiring developers to provide underground electrical service for all new subdivisions, developments and projects, and (c) facilitating local undergrounding projects by allowing underground conduit and cable, and associated above-ground transformers and switch cabinets to be placed in road rights-of-way under specific standards and agreements.

5. Enhance **vegetation management initiatives** by (a) accelerating main line (feeder) clearing to complete 75% of each year's planned line clearing work before the peak

hurricane season, (b) completing line clearing for circuits serving top critical infrastructure facilities (CIFs) prior to hurricane season 2006 and prior to every hurricane season thereafter, (c) ensuring a 3-year line clearing cycle for all main lines (feeders), (d) aggressively promoting our "Right Tree – Right Place" program to educate communities and improve shared responsibility with customers regarding the placement, removal, species and type of trees in proximity to power lines, and (e) supporting legislation that would regulate and enforce the species, type, placement and removal of trees and vegetation in proximity to electric facilities, and enhance utility rights of access to property to clear lines through local code enforcement assistance.

We are confident that these initiatives will ultimately result in fewer outages during severe weather events. When outages do occur, service will be restored faster, particularly to critical infrastructure facilities and to main thoroughfares where businesses that provide basic necessities such as gas stations and grocery stores are located. Our plan clearly demonstrates that just as Florida's weather is changing, so are we.

INITIATIVES

I. Post-Hurricane Repairs and Targeted Facility Upgrades to Prepare FPL's System for the 2006 Hurricane Season

Our restoration process has two components – the initial restoration phase, when all customers affected by storm-related outages are restored; and the recovery phase, when facilities affected by hurricane are restored to pre-storm condition. As a result of the 2005 hurricane season, a comprehensive field assessment of all distribution, transmission and substation facilities was initiated. Follow-up work to our system is ongoing to repair and restore distribution, transmission and substation facilities that were damaged and left weakened during the 2005 hurricane season, and to replace facilities where necessary. Additionally, certain near-term work is being performed to strengthen targeted facilities prior to the onset of the 2006 hurricane season. Our action plan includes the following:

- Distribution Follow-Up Work on Poles
  - Replace damaged poles, including those braced during restoration
  - Straighten leaning poles
  - Remove pole stubs
- Other Distribution Follow-Up Work
  - Replace damaged lightning arrestors
  - Replace or repair capacitor banks
  - Replace or repair switches
  - Address various other components of electrical infrastructure damaged during last year's hurricane season
- Distribution Facility Strengthening

    - Replace conductor along targeted main lines (feeders) serving critical infrastructure facilities (*e.g.*, Port Everglades)
    - Complete Thermovision inspections and follow-up repairs to identified 500 main lines (feeders) to proactively address potential causes of interruptions
- Transmission Line Follow-Up Work and Targeted Facility Strengthening
    - Rebuild seven miles of the Conservation-Corbett 500kV transmission line that experienced structural damage
    - Inspect all 500kV lines within the impacted area of Hurricane Wilma and make hurricane-related repairs as identified
    - Relocate the wood pole line off the berm of Lake Okeechobee and rebuild with concrete poles
    - Replace existing ceramic post insulators with better performing polymer post insulators on facilities with the highest customer impacts
- Substation Facility Strengthening
    - Accelerate replacement of silicon carbide arrestors to better performing arrestors on transformers with the highest customer impact
    - Harden selected equipment assemblies at 500 kV substations and bus connections at 15 substations

As we complete our follow-up work on facilities during this recovery phase, it should be noted that we are also often replacing identified facilities with ones that meet current, higher standards than those in place at the time of initial installation, which will improve the overall robustness of FPL's system.

The above initiatives help to address the immediate operating viability and reliability of our infrastructure prior to the onset of the 2006 hurricane season. The initiatives that follow are more comprehensive in nature and address the longer-term strength and resiliency of our electrical system.

II. Pole Inspection, Treatment and Replacement

FPL's distribution poles are currently designed to meet NESC standards, and most poles are designed 50% stronger than NESC minimum requirements. FPL's distribution poles are inspected as part of a three-pronged approach: (1) a Thermovision program that visually inspects all main line (feeder) poles; (2) a targeted wood-pole inspect and treat program; and (3) pole inspections that are done as part of daily work activities. FPL's transmission poles have been designed to meet extreme wind-loading criteria at the time of construction, and are currently inspected, treated and replaced as necessary on a 3, 4 or 8-year cycle, depending on material and customer count.

The failure rate of FPL's distribution poles during the 2004 and 2005 hurricanes was low. With respect to Hurricane Wilma, KEMA determined that of the distribution poles that experienced hurricane force winds, the distribution pole failure rate (1.46% of the total population of distribution poles that were exposed to hurricane-force winds) was consistent with

the failure rate that would have otherwise been expected for a hurricane of that storm's size and strength. KEMA concluded that wind was the predominant root cause of pole breakage. Notwithstanding the low distribution pole failure rate, given the expectation that Florida is experiencing a heightened cycle of increased hurricane activity, FPL is taking the following action:

- Modify the existing pole inspection and treatment program to establish a systematic inspection and treatment cycle of ten (10) years for all distribution wood poles, including those poles carrying FPL facilities that are owned by other utilities (consistent with recent FPSC staff recommendations)
- Prioritize inspection of creosote-treated wood poles (the oldest type of pole within distribution system) by the onset of the 2006 hurricane season
- Replace as necessary those poles identified as having deficiencies
- Report findings to the FPSC of such inspections, treatment and replacement on an annual basis
- Work with other utilities (*e.g.*, telephone, cable) to address joint use issues pertaining to loading and their own inspection programs

III. Hardening the Electrical Infrastructure

New Construction

All of FPL's distribution facilities meet or exceed NESC standards. However, given the severe nature of the 2004 and 2005 hurricane seasons and, as the FPSC has recognized, the fact that meteorological experts have determined that Florida is in a long-term cycle of increased hurricane activity. FPL proposes to take the following action:

- Adopt the NESC extreme wind-loading criteria as the standard for all new distribution construction (up to 150 mph in certain areas). This standard will be applied as specified by established NESC extreme wind velocity zones (*see* Exhibit A), and may be achieved using construction methods such as undergrounding, stronger poles (including concrete poles where appropriate), shorter spans, guying, etc.

Changes in new construction standards for transmission and substation facilities are not indicated or recommended.[2] That said, we are taking proactive action as follows:

[2] FPL's transmission and substation facilities are designed in accordance with NESC extreme wind loading criteria applicable at the time of design. During the 2004 and 2005 hurricanes, the transmission lines built to the current standard of concrete poles and polymer insulators performed well. During Hurricane Wilma, a total of 345 transmission line sections were interrupted; of these 65% had no damage. (Note that countermeasures to address the 35% of transmission line sections that were damaged are included in the "Hardening the Electrical Infrastructure" section of this paper). The most probable cause of the interruption of those undamaged transmission lines was wind-blown debris including trees, branches and vegetative material from outside FPL's easements and rights-of-way, which likely self-cleared the impacted facilities. In total, these 345 line sections disrupted service to 241 substations, of which only 8 had damage requiring repairs prior to restoring service.

- Enhance our current standards for substation fences and control house roofs where appropriate (Note: Although this damage did not cause any outages, substation roof and fence damage was found at 26 locations after Hurricane Wilma.)

System Upgrades

System upgrades are generally described as projects aimed at substantially changing the current state of existing facilities, through programs such as system expansion, relocations and major maintenance/rebuild projects. FPL intends to take the following action with respect to system upgrades:

- Apply NESC extreme wind velocity zone criteria in those instances when main lines (feeders) have to be relocated along road rights-of-way or are being substantially upgraded due to increased electrical demand

Long-Term Hardening of Targeted Facilities

In addition to new construction and system upgrades, a targeted, long-term approach to systematically increasing the strength and resiliency of existing electrical infrastructure that serves critical infrastructure facilities (CIFs) and major thoroughfares is necessary. To accomplish this, long-term retrofit projects will be undertaken with the sole purpose of hardening identified facilities. The following proactive hardening plans are being initiated:

- Develop a comprehensive, detailed ten-year hardening plan for distribution infrastructure based on additional independent and internal analyses, including recommendations for infrastructure hardening developed with assistance from KEMA
- Upgrade existing overhead main lines (feeders), initially targeting those serving top critical infrastructure facilities and major thoroughfares (with gas stations, grocery stores, etc.) within the first five years, with the objective of applying NESC extreme wind-loading criteria where feasible and practical
- Initiate a long-term plan to replace remaining transmission line ceramic post insulators, single-pole unguyed wood transmission structures, and substation transformer surge arresters constructed under legacy standards

This will be the first time that any electric utility operating in the United States has adopted the NESC extreme wind-loading criteria for distribution facilities. This will, undoubtedly, have profound long-term benefits to all our customers and the communities we serve.

IV. Undergrounding

Currently 37% of FPL's distribution infrastructure is underground. FPL's current policy is to install underground facilities in high density areas where multiple power lines are required to serve customers, or where local ordinances require underground construction for new residential subdivisions. Pursuant to FPSC rule, FPL's customers pay the differential cost between overhead and underground pursuant to existing tariff. There are specific applications under which underground service is less desirable than overhead service for reasons of site engineering or due to extended outages after storm surge or flooding. However, analysis from the 2004 hurricanes and Hurricane Katrina which impacted FPL's service area indicated that underground facilities incurred fewer main line (feeder) interruptions during each hurricane. In addition, we recognize that many communities have expressed an interest in pursuing conversion from overhead to underground. Therefore, FPL intends to take the following actions:

- Promote the conversion of electric distribution facilities from overhead to underground by offering to invest 25% of the cost of local government-sponsored conversion projects otherwise borne by the requesting locality, with the FPSC recognizing such investment as new plant in service
    - All property located within any area designated by the locality for conversion would be required to convert from overhead to underground service in order to ensure that the potential benefits to the new underground area's robustness are not compromised by interceding overhead facilities that are exposed to causes of overhead outages
- Aggressively enhance existing efforts with local governments to strongly encourage ordinances requiring developers to provide underground electrical service for all new subdivisions, developments and projects
- Support legislation that would require developers throughout the state to provide underground electrical service for all new subdivisions, developments and projects
- Support and assist efforts of communities to obtain funding assistance from federal and state agencies to defray costs of underground conversion projects
- Facilitate local undergrounding projects by allowing underground conduit and cable, and associated above-ground transformers and switch cabinets to be placed in road rights-of-way under specific standards and agreements

V. Vegetation Management

Evidence and analysis from the 2004 and 2005 hurricane seasons shows that trees and vegetation interfering, damaging or breaking poles, lines and other facilities were the greatest cause of hurricane-related outages. FPL's current line clearing practice is to clear distribution lines on a 3-year average cycle (an average of 4,600 feeder miles annually). Our line clearing practices, which include directional pruning methods, meet ANSI A-300 and NESC tree trimming standards and follow the guidelines recommended by both the International Society of Arboriculture and the National Arborist Association.

That said, vegetation management is an area that FPL cannot unilaterally control. Our forensic team's analysis of tree-related distribution feeder and lateral outages from Hurricanes Katrina and Wilma in 2005 concluded that 81% of tree-related outages were not preventable by FPL; that is, no trimming standard or work performed by FPL would have prevented these outages from occurring. These outages were caused by damage to FPL facilities from trees located off rights-of-way or outside of FPL's property or its easements which toppled into FPL's poles, lines and other facilities, or by limbs breaking off from trees and vegetative material located outside of FPL's trim zone. In addition, FPL's transmission system had 22 trees located outside of FPL's transmission rights-of-way that impacted facilities. As previously indicated, no damage was observed on the vast majority of transmission line sections interrupted by Hurricane Wilma, indicating that these facilities were impacted by flying debris, including tree branches and other vegetative material from outside FPL's easements and rights-of-way, that likely self-cleared from the impacted lines. For its part, to mitigate the prospect of outages caused by trees and vegetation interfering with, damaging or breaking electrical facilities, FPL is taking the following action:

- Accelerate main line (feeder) clearing to complete 75% of each year's planned line clearing work before the peak hurricane season
- Complete line clearing for circuits serving top critical infrastructure facilities (CIFs) prior to hurricane season 2006 and prior to every hurricane season thereafter
- Ensure a 3-year line clearing cycle for all main lines (feeders)
- Aggressively promote "Right Tree – Right Place" program to heighten community education and shared responsibility between FPL, communities and customers for tree species, type, location and proximity to power lines
- Support legislation that would regulate and enforce the species, type, placement and removal of trees and vegetation in proximity to electric facilities, and also enhance utility rights of access to property to clear lines through local code enforcement assistance

CONCLUSION

We have all experienced firsthand the significant impact of recent hurricanes in our state. No utility has had to respond to as many direct hits by hurricanes in recent years as FPL. We recognize that if the recent cycle of increased hurricanes activity is the new storm paradigm for our state, FPL's service area and its customers will undoubtedly be impacted. Without fundamental and significant changes in the way we prepare for storms and harden our infrastructure to prevent outages, we believe that the level of disruptions to our electrical system may well continue into the future. That is unacceptable to FPL, as it is unacceptable to our customers.

However, it is a reality that, regardless of the initiatives that we set forth above, when hurricanes and severe weather events impact our state, outages will occur. It is our intention, however, to take the steps necessary to mitigate such impact. The tactical and strategic initiatives

we have outlined not only address the resiliency of our system to future severe weather events, but also provide for an increased level of day-to-day reliability for our customers. In addition to the initiatives outlined above, FPL intends to make further refinements to this action plan based on additional input and analyses, and will include such refinements as part of our 10-year hardening plan. We expect this plan to provide a clear roadmap to improving the long-term resiliency of our electric infrastructure, and will submit it to you later this year. Furthermore, we will include localized hardening plans that we will share with respective community leaders and local emergency managers.

DOCKET NO. 070299-EI
GULF POWER COMPANY'S STORM HARDENING PLAN

CROSS-EXAMINATION EXHIBIT 47

GULF POWER'S RESPONSE TO PCB INTERROGATORY NO. 16

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI EXHIBIT 47
COMPANY FPL (Rebuttal)
WITNESS Edward S. Battaglia (PCB/Mann)
DATE 10/02-03/07

16. For Gulf's system, please provide the following outage data, including:

a. Summary tables for annual outages for each year of the most recent 10-year period, which include data showing:

(1) cause of outages;
(2) number of customers without power;
(3) length of outages; and
(4) cost to restore power.

b. For major storms (named tropical storms and hurricanes), please provide by storm for the most recent 10 years:

(1) name of storm;
(2) number of customers without power;
(3) length of outage, including a distribution of the number of customers experiencing outages for 1 day, 2 days, 3 days, and so on until 100 percent of customers were capable of receiving service from Gulf's facilities; and
(4) cost to restore power.

ANSWER:

a. (1)-(3)

1999		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	45,067	62.82
Lightning	115,846	138.40
Deterioration	56,658	107.46
Tree	52,567	103.82
Other	33,122	71.76
Equipment Failure	10,474	172.65
Overload	16,647	102.72
Vehicle	17,708	120.13
Wind/Rain	14,807	99.06
Dig-In	7,936	145.44
All Others	21,465	87.876
Total	392,297	99.38

2000		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	46,763	62.75
Lightning	104,353	123.78
Deterioration	34,946	136.74
Tree	82,941	118.86
Unknown	48,714	83.46
Overload	17,183	97.99
Vehicle	28,082	147.82
Other	15,551	89.71
Wind/Rain	20,574	117.94
None	15,313	127.57
All Others	30,541	104.07
Total	444,961	99.11

2001		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	44,660	68.29
Lightning	64,262	131.42
Deterioration	35,221	136.39
Tree	65,958	115.83
Unknown	46,125	87.18
Vehicle	21,010	161.74
Overload	9,990	97.55
Dig-In	7,772	175.18
Other	18,300	83.87
Wind/Rain	4,723	126.07
All Others	22,015	115.53
Total	340,036	101.27

2002		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	50,203	68.95
Lightning	81,950	143.43
Deterioration	41,163	138.55
Unknown	47,157	98.54
Tree	74,397	116.92
Vehicle	19,650	139.39
Overload	17,091	106.51
Wind/Rain	12,622	138.49
Other	14,609	102.40
Vines	1,821	84.66
All Others	12,129	130.99
Total	372,792	105.42

2003		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	39,525	66.77
Lightning	94,870	122.35
Unknown	56,034	95.96
Deterioration	31,336	133.91
Tree	53,360	105.20
Vehicle	28,222	147.26
Overload	14,033	92.89
Vines	2,544	87.03
Wind/Rain	5,478	108.80
Dig-In	2,534	168.06
Other	4,394	99.06
All Others	12,265	110.70
Total	344,595	100.93

2004		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Animal	25,713	80.72
Deterioration	36,565	161.42
Lightning	71,993	150.80
Unknown	63,406	135.40
Tree	85,789	128.90
Vehicle	30,436	161.59
Overload	10,960	126.00
Dig-In	3,489	169.54
Other	8,152	123.72
Wind/Rain	5,188	125.12
Vines	1,287	97.62
All Others	8,305	108.38
Total	351,283	129.45

2005		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Unknown	122,885	141.11
Lightning	106,902	191.64
Deterioration	37,703	186.81
Animal	17,570	91.60
Tree	56,534	138.41
Vehicle	44,163	171.03
Overload	16,322	107.74
Wind/Rain	15,683	146.49
Dig-In	8,734	214.18
Contamination/Corrosion	549	194.29
All Others	36,940	109.94
Total	463,985	151.99

2006		
Cause	**Customers Interrupted**	**Average Duration (L-Bar)**
Lightning	121,635	173.87
Deterioration	50,737	163.05
Animal	30,737	83.35
Tree	92,922	157.13
Unknown	61,584	218.64
Wind/Rain	90,543	380.73
Vehicle	34,036	156.35
Overload	13,671	108.96
Dig-In	4,477	192.45
Contamination/Corrosion	7,918	138.64
All Others	27,080	113.67
Total	535,340	169.54

a. (4) Information is not available.

b. (1) – (3) This information is not available for other storms.

2001 - Tropical Storm Barry	
Peak	37,000
Power was restored to 98% the same day.	

2002 - Tropical Storm Hanna	
Peak	34,623
Power was restored to 90% the same day.	

2005 - Tropical Storm Isidore	
Peak	50,000
Power was restored to 76% the same day.	

2004 – Hurricane Ivan		
Day	**Customers Out**	**Customers Restored**
See Production of Documents No. 12.		

2005 - Tropical Storm Arlene	
Peak	11,300
Power was restored the same day.	

2005 - Tropical Storm Cindy	
Peak	6,297
7/6/2005	739
7/7/2005	102

2005 – Hurricane Dennis		
Day	**Customers Out**	**Customers Restored**
See Production of Documents No. 12		

2005 – Hurricane Katrina		
Day	**Customers Out**	**Customers Restored**
See Production of Documents No. 12		

b. (4)

	$(000's)
1997 Hurricane Danny	383
1998 Hurricane Georges	4,087
1998 Hurricane Earl	441
2000 Tropical Storm Helena	124
2001 Tropical Storm Barry	1,069
2002 Tropical Storm Hanna	1,107
2002 Tropical Storm Isidore	1,903
2004 Hurricane Ivan	136,076
2005 Hurricane Dennis	60,771
2005 Tropical Storm Arlene	836
2005 Hurricane Katrina	4,404

These costs include damages incurred to facilities and generating plants. These amounts do not include the cost to reconnect service to customers whose homes were severely damaged or destroyed and could not accept service at the time power was restored. It also does not include any estimates to restore service to facilities at Fort Pickens and Opal Beach that are dependent on final plans of the U.S. Park Service.

DOCKET NO. 070299-EI
GULF POWER COMPANY'S STORM HARDENING PLAN

CROSS-EXAMINATION EXHIBIT 48

GULF POWER'S RESPONSES TO PCB INTERROGATORIES 39 & 40

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070299-EI EXHIBIT 48
COMPANY FPL (Rebuttal)
WITNESS Edward J Battaglia (PCB/MUNC)
DATE 10/02-03/07

39. For each of the 3 Municipalities, please provide plant account records by account and by vintage years for the past 5 years for overhead and underground distribution facilities.

ANSWER:

The distribution facilities described in the above request are Mass property. Detailed records are not available for Mass Property distribution line by physical location.

40. For each of the 3 Municipalities, please provide Continuing Property Records (CPR) by unit (if available) and FERC account detail with original costs, accumulated depreciation with depreciation value shown and net book value.

ANSWER:

Detailed records are not available for Mass Property distribution line by physical location.

Tropical Cyclone Report
Hurricane Wilma
15-25 October 2005

Richard J. Pasch, Eric S. Blake, Hugh D. Cobb III, and David P. Roberts
National Hurricane Center
12 January 2006

Updated 28 September 2006 for one additional fatality in Grand Bahama Island, a revised U.S. damage estimate, and storm surge and damage in Grand Bahama Island.

Wilma formed and became an extremely intense hurricane over the northwestern Caribbean Sea. It had the all-time lowest central pressure for an Atlantic basin hurricane, and it devastated the northeastern Yucatan Peninsula. Wilma also inflicted extensive damage over southern Florida.

a. Synoptic History

Wilma had a complicated beginning. During the second week of October, an unusually large, monsoon-like lower-tropospheric circulation and a broad area of disturbed weather developed over much of the Caribbean Sea. This system appeared to have been enhanced by an extensive area of diffluent flow to the south and southwest of an upper-level cyclone over the southwestern Atlantic. The easternmost portion of this low pressure area moved northeastward and merged with an extratropical cyclone. However, a more concentrated area of disturbed weather and surface low pressure formed near Jamaica by 14 October, possibly aided by a couple of tropical waves traversing the Caribbean during this time. Dvorak satellite classifications were initiated on this system at 1200 UTC 15 October. By 1800 UTC that day the surface circulation became well-enough defined, with sufficiently organized deep convection, to designate that a tropical depression had formed, centered about 190 n mi east-southeast of Grand Cayman. Figure 1 is a "best track" chart of the tropical cyclone's path, and time series of the wind and pressure are shown in Figs. 2 and 3, respectively. The best track positions and intensities are listed in Table 1.

A weak and ill-defined steering flow prevailed for the first couple of days of Wilma's existence, with a 500 mb high covering the Gulf of Mexico and another mid-tropospheric anticyclone located well to the east-northeast of the tropical cyclone. The depression moved slowly and erratically westward to west-southwestward for a day or so and then drifted south-southwestward to southward for a day or two. There was only slow strengthening during this period, and the system is estimated to have become a tropical storm at 0600 UTC 17 October. On 18 October Wilma turned toward the west-northwest and, while doing so, strengthened into a hurricane. Later that day, a remarkable, explosive strengthening episode began and continued through early on 19 October. By 0600 UTC 19 October, Wilma's winds had increased to near 150 kt (category 5 on the Saffir-Simpson Hurricane Scale). In the span of just 24 hours, Wilma had intensified from a 60-kt tropical storm to a 150-kt category 5 hurricane, an unprecedented event for an Atlantic tropical cyclone. It is fortunate that this ultra-rapid strengthening took

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI EXHIBIT 49
COMPANY FPL (Rebuttal)
WITNESS Manuel B. Miranda (MUUC)
DATE 10/02-03/07

place over open waters, apparently void of ships, and not just prior to a landfall. Wilma reached its peak sustained wind speed of 160 kt at around 1200 UTC 19 October. During the strengthening episode, Air Force reconnaissance observations indicated that the eye of the hurricane contracted to a diameter of 2 n mi; this is the smallest eye known to National Hurricane Center (NHC) staff. The estimated minimum central pressure at the time of peak intensity is 882 mb, which is a new record low value for a hurricane in the Atlantic basin. Indeed, the actual minimum pressure may well have been lower than this value, as noted in the following section.

Wilma maintained category 5 status until 20 October, when its winds decreased to 130 kt, and the tiny eye was replaced by one about 40 n mi across. Interestingly, the hurricane would retain this large, or an even larger, eye ranging from about 40 to 60 n mi in diameter, for most of the remainder of its lifetime. By 21 October, as mid-level ridging to the northeast of Wilma increased somewhat and a series of shortwave troughs in the westerlies began to erode the high over the Gulf of Mexico, the hurricane turned toward the northwest and north-northwest, taking aim at the Yucatan Peninsula of Mexico. Wilma's maximum winds were still near 130 kt (category 4 intensity) when its center made landfall on the island of Cozumel around 2145 UTC 21 October, and it was probably only slightly weaker (but still category 4 intensity) when it crossed the coast of the Yucatan peninsula about 6 hours later. On 22 October, the mid-tropospheric high pressure area to the north of Wilma essentially dissipated, and the hurricane moved slowly northward, crossing and severely battering the extreme northeastern Yucatan peninsula. Wilma emerged into the southern Gulf of Mexico around 0000 UTC 23 October, with maximum winds of near 85 kt. Although Wilma's intensity had been reduced due to its passage over land, it was still a large and powerful hurricane.

A vigorous mid-tropospheric trough, moving eastward from the central United States, provided an increasingly strong southwesterly steering current that accelerated Wilma northeastward toward southern Florida. As the upper-level flow over the hurricane increased, so too did the vertical shear, and by early on 24 October the environmental 850-200 mb shear (averaged over an annulus about 100 to 400 n mi from the center) was roughly 25 kt. Despite the strong shear in its surroundings, Wilma strengthened over the southeastern Gulf of Mexico and its winds reached about 110 kt as it approached Florida. Maximum sustained winds were estimated to be near 105 kt (category 3 intensity) when landfall of the center occurred in southwestern Florida near Cape Romano around 1030 UTC 24 October. Continuing to accelerate and now moving at a forward speed of 20 to 25 kt, the hurricane crossed the southern Florida peninsula in 4.5 hours, with the center emerging into the Atlantic just southeast of Jupiter around 1500 UTC. Maximum winds had decreased to near 95 kt (category 2) during the crossing of Florida. A vigorous cold front associated with the mid-tropospheric trough swept across the area to the west of Wilma, yet the cooler and drier air behind the front could not fully penetrate the inner core of the hurricane to weaken it. Very shortly after departing Florida, the hurricane re-intensified one last time, and its winds again reached 110 kt around 0000 UTC 25 October. Thereafter, Wilma finally succumbed to an unfavorable atmospheric environment and lost strength while racing northeastward at 40-50 kt over the western Atlantic. It became an extratropical cyclone around 0000 UTC 26 October while centered about 200 n mi southeast of Halifax, Nova Scotia. This extratropical low was absorbed by another extratropical cyclone located over eastern Nova Scotia around 0000 UTC 27 October.

b. Meteorological Statistics

Observations in Wilma (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the U. S. Air Force Weather Agency (AFWA), as well as flight-level and dropwindsonde observations from flights of the 53rd Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command (AFRES) and NOAA Aircraft Operations Center WP-3D aircraft. Microwave satellite imagery from NOAA polar-orbiting satellites, the NASA Tropical Rainfall Measuring Mission (TRMM), the NASA QuikSCAT, NASA Aqua, and Defense Meteorological Satellite Program (DMSP) satellites were also useful in tracking Wilma.

Highest winds measured by the AFRES were 168 kt at a flight level of 700 mb in the southeastern eyewall at 0610 UTC 19 October, when Wilma was over the northwestern Caribbean Sea. Using a standard eyewall reduction factor (ratio of surface to flight level winds of 0.9) yields a surface wind of 151 kt. Since the central pressure was still falling at the time of the last pass of the aircraft through the eye at around 0800 UTC, it is likely that the winds also increased some more from 0800 to 1200 UTC. Therefore the peak intensity of Wilma is estimated to be 160 kt at 1200 UTC 19 October. When Wilma was over the southeastern Gulf of Mexico, and approaching south Florida, the AFRES measured a 700 mb wind of 135 kt at 0646 UTC 24 October, apparently associated with a short-lived mesocyclone in the southeastern eyewall. Because of the strong southwesterly shear, the ratio of surface to flight level winds was probably smaller than that typical for the hurricane eyewall. Therefore the surface to 700 mb wind speed ratio is reduced from the normal 0.9 to 0.8, resulting in an estimated intensity of 110 kt at 0600 UTC 24 October. Subsequent sampling of the southeastern eyewall by the aircraft and Doppler radar observations showed that the winds had diminished somewhat, so the intensity of Wilma at landfall in southwestern Florida has been set at 105 kt.

Wilma's deepening rate over the northwestern Caribbean Sea, from late on 18 October to early on 19 October, was incredible. Over the period from 2310 UTC to 0433 UTC, the central pressure fell from 954 mb to 901 mb, which is a deepening rate of 9.9 mb per hour. The minimum central pressure measured by dropsonde was 884 mb at 0801 UTC 19 October. Surface winds from this dropsonde were measured to be 23 kt, so the dropsonde probably did not capture the lowest pressure in Wilma's eye. Therefore the pressure around 0800 UTC was probably a couple of mb lower than 884, estimated at 882 mb. This is the lowest central pressure in the NHC records for the Atlantic basin. Given that the pressure was still falling at this time, it is possible that the pressure then dropped a little below 882 mb. It should be added that the largest 6-, 12-, and 24-h drops in best track central pressure for Wilma, 54 mb from 0000 to 0600 UTC 19 October, 83 mb from 1800 UTC 18 October to 0600 UTC 19 October, and 97 mb from 1200 UTC 18 October to 1200 UTC 19 October, respectively, are by far the largest in the available records for these periods going back to 1851. The previous record 6-h deepening was 38 mb in Hurricane Beulah, September 1967, the previous record 12-h deepening was 48 mb in Hurricane Allen, August 1980, and the previous record 24-h deepening was 72 mb in Hurricane Gilbert, September 1988.

Ship reports of winds of tropical storm-force associated with Wilma are given in Table 2, and selected surface observations from land stations and data buoys are given in Table 3. A 10-min average wind of 87 kt with a gust to 113 kt was observed in Cancun, Mexico, but it is not certain if these were the maximum values at that station. Islas Mujeres, very near Cancun, experienced hurricane-force winds in gusts for nearly a 24-h period from 21-22 October.

The highest sustained wind measured at an official surface observing site in Florida was a 15-min average speed of 80 kt from a South Florida Water Management District (SFWMD) observation site, L006, in Lake Okeechobee. It should be noted that another SFWMD platform, LZ40, located only about 5 n mi north of L006 recorded a 15-min wind speed of 79 kt at the same time. It is reasonable to assume that these measurements correspond to a 1-min average wind speed of at least 90 kt. A number of official surface wind observation (ASOS) sites in Miami-Dade and Broward Counties stopped reporting data at their highest noted sustained wind speeds, such as Opa-Locka Airport at 74 kt and Pompano Beach Airport at 72 kt. It is likely that higher sustained wind speeds occurred at these sites. Data from the Miami WSR-88D Doppler radar indicated a peak velocity of 138 kt at an elevation of about 5000 ft over western Broward County. A comparison of Doppler velocities with co-located, official 2-min and 1-min surface wind measurements in Miami-Dade in Broward Counties suggests that the ratios of surface to 5000 ft sustained wind velocities over southeastern Florida in Wilma were likely in the range of 0.65 to 0.70. This would result in a maximum surface wind speed estimate of 90-95 kt.

Based on the surface observations and the Doppler data it can be concluded that most of the southeastern Florida peninsula experienced at least category 1 hurricane conditions, and that some parts of northern Miami-Dade County, Broward, and Palm Beach Counties likely had category 2 hurricane conditions, including wind gusts to near 100 kt, at the standard 10 m height above ground. It is expected that the upper floors of the many high rise buildings in South Florida experienced wind speeds greater than occurred there at 10 m.

Although no measurements of storm surge heights in the area of the northeastern Yucatan Peninsula have been received, it is likely that parts of that area experienced a surge of at least 12 to 15 ft. Significant storm surges likely occurred over portions of extreme western Cuba, but no measurements are available. A storm surge of 4 to 8 ft was reported from coastal Collier Counter. It is likely, however, that higher storm surges occurred over uninhabited areas of southwestern Florida to the south of where Wilma made landfall. Storm surges of 4 to 5 ft were observed over much of the lower and middle Florida Keys, locally to near 7 ft. However, a storm surge of near 9 ft was estimated visually in the Marathon area. Storm surges were generally in the 4 to 5 ft range over the upper Keys. This resulted in considerable flooding over substantial portions of the Keys. Relatively minor storm surge flooding occurred on the Biscayne Bay shoreline of Dade County. Storm surges of 12 ft or more were measured along the southwestern coastal area of Grand Bahama Island.

Wilma produced torrential rainfall as it moved slowly over portions of the eastern Yucatan Peninsula. According to the Meteorological Service of Mexico, a 24-h rainfall total of 62.05 inches was measured at Islas Mujeres. Because the hurricane moved quickly across the southern Florida peninsula, however, the rain amounts were not very large in Florida and storm

totals ranged generally from 3 to 7 inches. Some locations in southeast Florida had totals of only 1 to 2 inches -- or less.

Wilma produced 10 tornadoes over the Florida peninsula on 23-24 October: one each in Collier, Hardee, Highlands, Indian River, Okeechobee, and Polk Counties, and four in Brevard County.

Figure 4 is an image of Wilma while it was located over South Florida from the Miami WSR-88D radar. Note the large area that was impacted by the eyewall.

c. Casualty and Damage Statistics

Twenty-three deaths have been directly attributed to Wilma: 12 in Haiti, 1 in Jamaica, 4 in Mexico, 5 in Florida, and 1 in the Bahamas (Grand Bahama Island).

Damage was reported to have been very severe in portions of the northeastern Yucatan Peninsula, but detailed information from Mexico is not available. This dealt a major blow to the tourist industry in that area. There was major flooding from storm surge and/or wave action in portions of western Cuba. In southern Florida, the swath of damage was unusually widespread due to the large size of Wilma's core. The damage included numerous downed trees, substantial crop losses, downed power lines and poles, broken windows, extensive roof damage, and destruction of mobile homes. Wilma caused the largest disruption to electrical service ever experienced in Florida. Media reports indicate up to 98 per cent of South Florida lost electrical service, and Florida Power and Light reported outages in 42 Florida counties. The amount of total insured damage compiled by the Property Claim Services of the Insurance Services Office, Inc., is $10.3 billion. Using a doubling of insured losses to obtain the total damage gives a current estimate of Wilma's U.S. damage of $20.6 billion, making Wilma the third costliest hurricane in U.S. history, behind only Katrina and Andrew. There was also significant damage in the southwestern coastal area of Grand Bahama Island, with widespread destruction of roofs and vehicles along with uprooting of poles and trees.

d. Forecast and Warning Critique

Average official track errors (with the number of cases in parentheses) for Wilma were 29 (39), 42 (37), 61 (35), 84 (33), 136 (29), 264 (25), and 382 (21) n mi for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. For 12 through 72 h, these errors are less than the average official track errors for the 10-yr period 1995-2004[1], but they exceed the 2001-2004 average errors at 96 and 120 h. There were some large along-track errors in the official forecasts for these longer time ranges; and the along-track biases indicate that the 4- and 5-day NHC forecasts for Wilma were, in general, too fast. Although the track guidance models were in general agreement that Wilma would cross the Florida peninsula, there was considerable spread in predicted forward speed. This was associated with large uncertainty in the timing of the hurricane strike on Florida. Table 4 shows the mean track errors for the various models and model combinations, and for the official forecasts. On average, the most accurate numerical

[1] Errors given for the 96 and 120 h periods are averages over the four-year period 2001-4.

guidance through 48 h was provided by the Florida State University Superensemble, and for 72 through 120 h by the NCEP Global Ensemble and the United Kingdom Meteorological Office global model. Interestingly, the NCEP Global Ensemble had a mean 5-day track error that was about 100 n mi less than the NCEP Global Forecast System (the parent model of the ensemble).

Average official intensity errors were 11, 18, 22, 22, 30, 27, and 25 kt for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. These errors are quite a bit larger than the average official intensity errors over the 10-yr period 1995-2004. There was a negative bias (i.e. underforecast of intensity) at all forecast times. As might be expected for such a rapidly strengthening hurricane, there were some very large individual underforecasts of intensity when Wilma was over the northwestern Caribbean Sea – by as much as 80 kt at 48 h. The official forecasts did not explicitly predict Wilma to regain category 3 intensity before hitting Florida, but the NHC Tropical Cyclone Discussions on 22-23 October did note the possibility that the system could again be a major hurricane as it approached the coast of Florida.

Within a day of Wilma's genesis over the western Caribbean Sea, the Tropical Weather Outlooks issued by the National Hurricane Center anticipated the formation of a tropical depression, including (just prior to genesis) the possibility of development into a hurricane.

Table 5 lists the watches and warnings issued for Wilma. There was considerable lead time in the issuance of the hurricane warnings for the northeastern Yucatan Peninsula, as these warnings were posted well over 48 h prior to landfall in that area. Likewise the hurricane warning for Florida was issued well in advance, 31.5 h before Wilma's center made landfall there.

e. Acknowledgements

Most of the surface observations in this report were provided by the meteorological services of Mexico and Cuba, and National Weather Service Forecast Offices (NWSFOs) in Key West, Miami, Tampa, Melbourne, Jacksonville and Tallahassee Florida. Dan Brown, Lixion Avila, Jack Beven, James Franklin, Rick Knabb, Max Mayfield, Ed Rappaport, and Stacy Stewart of TPC/NHC provided useful comments. Colin McAdie of TPC/NHC along with Robert Molleda and Pablo Santos of the Miami NWSFO helped to analyze the WSR-88D data. Eric Swartz of the SFWMD helped with the wind observations from the SFMWD network.

Table 1. Best track for Hurricane Wilma, 15-25 October 2005.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
15 / 1800	17.6	78.5	1004	25	tropical depression
16 / 0000	17.6	78.8	1004	25	"
16 / 0600	17.5	79.0	1003	30	"
16 / 1200	17.5	79.2	1003	30	"
16 / 1800	17.5	79.4	1002	30	"
17 / 0000	17.4	79.6	1001	30	"
17 / 0600	16.9	79.6	1000	35	tropical storm
17 / 1200	16.3	79.7	999	40	"
17 / 1800	16.0	79.8	997	45	"
18 / 0000	15.8	79.9	988	55	"
18 / 0600	15.7	79.9	982	60	"
18 / 1200	16.2	80.3	979	65	hurricane
18 / 1800	16.6	81.1	975	75	"
19 / 0000	16.6	81.8	946	130	"
19 / 0600	17.0	82.2	892	150	"
19 / 1200	17.3	82.8	882	160	"
19 / 1800	17.4	83.4	892	140	"
20 / 0000	17.9	84.0	892	135	"
20 / 0600	18.1	84.7	901	130	"
20 / 1200	18.3	85.2	910	130	"
20 / 1800	18.6	85.5	917	130	"
21 / 0000	19.1	85.8	924	130	"
21 / 0600	19.5	86.1	930	130	"
21 / 1200	20.1	86.4	929	125	"
21 / 1800	20.3	86.7	926	120	"
22 / 0000	20.6	86.8	930	120	"
22 / 0600	20.8	87.0	935	110	"
22 / 1200	21.0	87.1	947	100	"
22 / 1800	21.3	87.1	958	85	"
23 / 0000	21.6	87.0	960	85	"
23 / 0600	21.8	86.8	962	85	"
23 / 1200	22.4	86.1	961	85	"
23 / 1800	23.1	85.4	963	90	"
24 / 0000	24.0	84.3	958	95	"
24 / 0600	25.0	83.1	953	110	"
24 / 1200	26.2	81.0	950	95	"
24 / 1800	28.0	78.8	955	105	"
25 / 0000	30.1	76.0	955	110	"
25 / 0600	33.3	72.0	963	100	"
25 / 1200	36.8	67.9	970	90	"
25 / 1800	40.5	63.5	976	75	hurricane

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
26 / 0000	42.5	60.0	978	60	extratropical
26 / 0600	44.0	57.5	982	55	"
26 / 1200	45.0	55.0	986	50	"
26 / 1800	45.5	52.0	990	40	"
27 / 0000					merged with low
21 / 2145	20.6	86.8	927	130	landfall on Cozumel, Mexico
22 / 0330	20.8	86.9	933	115	landfall near Puerto Morelos, Mexico
24 / 1030	25.9	81.7	950	105	landfall near Cape Romano, Florida
19 / 1200	17.3	82.8	882	160	minimum pressure

Table 2. Selected ship and drifting buoy reports with winds of at least 34 kt for Hurricane Wilma, 15-25 October 2005.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
20 / 1200	WCY845	18.8	80.2	130 / 36	1007.0
20 / 2100	DDPH	18.9	82.3	140 / 35	1004.0
23 / 2100	A8FN3	20.3	84.2	240 / 43	1001.6
23 / 2100	P3GY9	21.8	85.3	260 / 46	993.0
24 / 0000	ZCAM4	23.4	88.1	340 / 37	1002.2
24 / 0000	V7HD2	28.3	88.0	010 / 37	1009.0
24 / 0600	WCY845	20.0	82.6	230 / 35	1004.0
24 / 0600	KS049	26.4	85.2	010 / 39	993.8
24 / 0900	KS049	25.7	86.0	350 / 41	997.6
24 / 1054	ANCF1	28.2	82.8	010 / 37	999.0
24 / 1154	FHPF1	28.1	82.8	020 / 39	999.6
24 / 1200	H3VT	25.6	77.1	160 / 44	1002.0
24 / 1200	WAAH	26.8	76.9	160 / 37	1000.0
24 / 1300	PMYF1	26.9	80.6	110 / 43	-99.0
24 / 1500	WAAH	26.2	76.2	170 / 39	999.5
24 / 1800	MYSU5	24.1	74.8	190 / 49	1005.6
24 / 1800	V7HD2	28.3	87.7	340 / 36	1015.0
24 / 1800	41625	27.6	70.5	210 / 43	1002.7
24 / 1900	41646	25.3	75.5	200 / 41	1001.2
24 / 2000	41646	25.3	75.5	200 / 39	1000.3
24 / 2100	WAAH	25.7	75.8	230 / 44	997.8
24 / 2128	TYBG1	31.6	79.9	330 / 35	996.0
24 / 2200	3FMX7	36.4	74.6	020 / 47	996.4
24 / 2200	41630	26.7	74.0	220 / 41	999.5
24 / 2233	SKMG1	31.5	80.2	310 / 37	998.0
24 / 2333	SKMG1	31.5	80.2	310 / 39	999.4
25 / 0000	ZCDF4	23.2	79.0	270 / 38	1007.9
25 / 0000	PDBO	28.6	67.2	210 / 35	1008.8
25 / 0000	KRHX	35.5	75.2	020 / 41	992.0
25 / 0000	41625	27.7	70.5	200 / 39	1005.7
25 / 0050	41934	28.6	72.5	*** / 41	997.4
25 / 0059	BRBN4	39.6	74.2	070 / 35	1002.4
25 / 0128	TYBG1	31.6	79.9	310 / 39	1000.5
25 / 0200	41625	27.8	70.4	210 / 41	1006.2
25 / 0300	KRHX	36.2	75.3	050 / 40	990.8
25 / 0459	AVAN4	39.1	74.7	070 / 35	995.0
25 / 0500	3FMX7	37.4	74.4	020 / 48	989.2
25 / 0600	A8ER9	34.9	75.2	350 / 37	989.0
25 / 0600	ZCDC2	37.0	75.1	030 / 38	991.0
25 / 0600	A8CJ2	37.4	74.2	050 / 37	987.0

25 / 0600	KAQP	40.2	66.3	090 / 36	997.5
25 / 0659	BRBN4	39.6	74.2	050 / 35	994.1
25 / 0900	KRPB	35.5	75.2	300 / 37	990.1
25 / 0900	WMVF	41.5	70.7	070 / 35	1001.0
25 / 1100	3FMX7	38.0	74.2	010 / 37	986.6
25 / 1200	V2AW5	27.3	69.0	190 / 37	1015.0
25 / 1200	ZCDC2	37.7	74.7	350 / 35	990.3
25 / 1200	SHJC	40.1	70.1	070 / 58	990.4
25 / 1200	VRWG6	43.8	62.9	070 / 40	1013.0
25 / 1500	VOTV	43.5	70.0	040 / 43	1002.0

Table 3. Selected surface observations for Hurricane Wilma, 15-25 October 2005.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Mexico								
Cancun			22/0000	87	113			
Cozumel		928.0						
Isla Mujeres	22/1930	968.6	22/0200	71	94			62.05
Siankaan								29.25
Cuba								
Bahia Honda			23/2225	49	60			
Caibarien			24/1459	27	34			
Casa Blanca			24/0040	62	73			
Colon			24/0503	27	43			
Cuba Francia			23/1650	38	48			
Indio Hatuey			24/0500	27	37			
Isabel Rubio			23/0220	38	51			
Jovellanos			24/0755	29	39			
La Fe			20/1256	41	51			
La Palma			23/2240	48	60			
Paso Real de San Diego			23/1705	24	42			
Pinar del Rio			23/2150	38	50			
Playa Giron			23/1959	32	46			
Punta del Este			20/1635	40	50			
San Juan y Martinez			23/1625	47	53			
Santa Lucia			23/2315	52	65			
Santiago de la Vegas			23/2025	43	57			
Santo Domingo			24/0550	28	38			
Union de Reyes			24/0615	26	35			
Varadero			24/0602	43	53			
Yabu			24/0552	29	39			

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Florida								
2 W TNT (FCMP)			24/1311	77	101			
20 Mile Bend (S-5AE)								4.33
7W Weston FCMP Tower T1 (26.1°N 80.5°W)	24/1254	952.2	24/1429	77	92			
Alligator Alley West (S-140)								4.61
Andytown (ANDF1)								4.47
Belle Glade (BELLW) SFWMD	24/1215	953.6	24/1515	68	102			
Big Cypress (BCSI)	24/1130	951.4	24/1345	35	70			5.19
Bings Landing (NOS)			24/2100	18	37	0.86		
Brighton (S-129)								5.65
Brooksville (KBKV)	24/1206	1000.3	24/1829	25	34			1.08
Cache (LPIF1)			24/1115	57	97			
Chekika (CHKF1)			24/1235	67	98			
Chokoloskee (USGS)						7.0		
Clermont COOP								3.82
Clewiston (CFSW)			24/1415	53	73			
Clewiston Field Station (COE)								7.31
Coral Springs (CSPF1)								2.67
Crescent City CREF1								3.02
Daytona Beach (KDAB)	24/1857	997.3	24/1857	25	38			4.82
Daytona Beach COOP								4.25
Deland COOP								3.18
Everglades City (EGC)			24/0955	49				
FCMP Tower T0 (25.9°N 81.3°W)	24/1050	952.2	24/1227	63	82			
FCMP Tower T2 (25.9°N 80.9°W)	24/1149	955.2	24/1057	71	95			
Fernandina Beach (NOS)	24/2100	1001.2				1.13		
FIU Main (FCMP)			24/1411	60[e]	83[e]			
Forever FL COOP								8.00

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Fort Lauderdale (KFLL)	24/1336	961.4	24/1211	61	86			3.04
Fort Lauderdale Executive (KFXE)	24/1133	977.3						
Fort Myers (KFMY)	24/1102	976.0	24/1216	54	66			
Fort Myers (KRSW)	24/1153	972.6	24/1229	51	69			5.44
Fort Pierce (KFPR)	24/1448	968.5	24/1606	45[e]	68[e]			5.47
Fort Pierce WP COOP								6.02
Hastings ARC HTGF1								3.65
Hialeah (HIAF1)								1.23
Hillsboro Canal (S-2)								5.25
Islamorada			24/0926		94			
Jacksonville Int'l Airport (KJAX)	24/2058	1001.0						
Kennedy Space Center Shuttle Landing Facility								10.78
Key West (KEYW)			24/0616	62	72			2.02
Key West Harbor (NOS)	24/0818	977.2	24/0836	51	74	2.76		
Kissimmee COOP								4.73
Lake Okeechobee (L001) SFWMD			24/1515	74	93			
Lake Okeechobee (L006) SFWMD			24/1500	80	97			7.00
Lake Okeechobee SW (LOKEEM) SFWMD								7.14
Lake Okeechobee (LZ40) SFWMD			24/1500	79	95			
Lakeland (KLAL)								7.34
Lakeport (S-131)								6.00
Leesburg (KLEE)	24/1846	999.0	24/1806	28	35			4.88
Lisbon COOP								5.03
Loxahatchee (LXWS)	24/1300	954.3	24/1545	62	98			3.12
Loxahatchee West								3.82
MacDill AFB (KMCF)			24/1055	21	37			2.53
Mayport (NOS)	24/2030	1000.6	24/2030	25	33	0.82		
Melbourne (KMLB)	24/1520	987.1	24/1600	42	52			4.25

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Melbourne (NWS)			24/1607		67			4.96
Miami (KMIA)	24/1225	967.5	24/1230	58	80			0.76
Miccosukee School			24/1100		93			
Miles City (RKIF1)			24/1235	34	76			4.69
NAS Jacksonville (KNIP)	24/1959	1000.3						
NASA LC39B (28.6°N 80.6°W)			24/1640	56	82			2.79
Naples (KAPF)	24/0942	965.8	24/1207	53[e]	71[e]			6.63
Naples Pier (NPSF1,NOS)	24/1024	960.9	24/1200	73	89	2.64		
Oasis (OASF1)			24/1330	46	86			2.33
Ocala (KOCF)	24/1735	1001.0	24/1735	23	34			
Ochoppi FCMP Tower T2			24/1227	64	84			
Ochopee (OCOF1)			24/1335	47				3.74
Opa Locka (KOPF)	24/1316	964.8	24/1216	74[e]	91[e]			
Orlando (KMCO)	24/1437	994.6	24/1212	35	42			5.17
Orlando (KORL)	24/1434	997.0	24/1723	30	43			3.88
Orlando East COOP								4.61
Ortona (ORTF1)								4.52
Palm Bay COOP								5.47
Palmdale								4.56
Patrick AFB			24/1521		64			6.95
Pinecastle Bombing Range (KNAE)	24/1851	998.6						
Plymouth COOP								3.81
Pompano Beach (KPMP)	24/1240	961.1[e]	24/1240	72[e]	85[e]			
Ponce Inlet COOP								3.07
Port Canaveral USCG	24/1600	992.0	24/1500	45	69			
Punta Gorda (KPGD)	24/1153	985.8	24/1252	45	61			3.93
ROTNWX (SFWMD)	24/1145	951.0	24/1200	56[e]	87[e]			
S7WX (SFWMD)	24/1215	952.3	24/1530	56	90			
S-140 (SFWMD)			24/1345	58	94			
STA5WX (SFWMD)	24/1145	950.5						

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
St. Augustine (KSGJ)	24/1945	999.7						
St. Petersburg (KPIE)	24/1145	997.6	24/1707	33	43			1.64
St. Petersburg (KSPG)	24/1153	995.9	24/1144	32	41			
Sanford (KSFB)	24/1820	995.9	24/1859	28	37			3.59
Sanford COOP								3.22
Sarasota (KSRQ)	24/1042	991.9	24/1350	31	42			3.81
Stuart (COOP)								4.55
Sweetwater (Miami WFO)	24/1210	966.5	24/1147	57	90			4.42
Tampa (KTPA)	24/1130	997.3	24/1629	30	38			1.44
Tenraw (ENPF1)			24/1120	66	92			2.64
Titusville COOP								6.90
Vaca Key (NOS)	24/0924	983.0	24/1412		52	6.43		
Vandenburg (KVDF)			24/1654	23	36			
Venice								7.45
Vero Beach (KVRB)	24/1531	975.3	24/1353	35[e]	48[e]			5.53
Vero Beach (COOP)								5.50
Vilano Beach (NOS)			24/1800	27	37	1.77		
Virginia Key (VAKF1)	24/1300	972.4	24/1318	65	87	3.61		
West Palm Beach (KPBI)	24/1225	975.0	24/1310	71	88			1.07
West Kendall (KTMB)	24/1152	970.5	24/1133	50[e]	72[e]			1.18
Winter Haven (KGIF)	24/1236	995.3	24/1630	31	40			4.77
Georgia								
Glynco Airport (KBQK)	24/2019	1001.4	24/2059	15	22			
New Brunswick (KNRB)	24/2053	1000.7	24/0536	21	27			
Saint Simons Island (KSSI)	24/2120	1001.0	24/1949	18	27	0.52		1.69
Waycross (KAYS)	24/2058	1003.0	24/2058	21	29			
Buoy/CMAN								
NOAA Buoy 41009 (28.5°N 80.2°W)	24/1720	985.2	24/1720	52	68			
NOAA Buoy 41010 (29.0°N 78.5°W)	24/1950	969.5	24/2050	62	82			

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
NOAA Buoy 41012 (30.0°N 80.6°W)	24/1950	995.3	24/1950	37	45			
NOAA Buoy 42003 (26.1°N 85.9°W)	23/2050	997.8	24/1020	36 (10 min)	47			
Buoy 42013 (27.2°N 83.0°W)	24/1010	993.1	24/1110	41	49			
Buoy 42023 (26.1°N 83.1°W)	24/0759	982.5	24/0959	49				
NOAA Buoy 42036 (28.5°N 84.5°W)	24/1150	1002.3	24/0850	37	43			
NOAA Buoy 42056 (19.9°N 85.1°W)	21/0800	986.6	21/0416	67	81			
NOAA Buoy 42057 (17.6°N 80.7°W)	18/2200	998.1	19/0600	50	59			
NOAA Buoy 44004 (38.5°N 70.5°W)	25/0050	1002.1	25/0050	37				
NOAA Buoy 44005 (43.2°N 69.2°W)	25/1750	992.4	25/1650	39				
NOAA Buoy 44007 (43.5°N 70.1°W)	25/1650	997.6	25/1650	35				
NOAA Buoy 44008 (40.5°N 69.4°W)	25/1350	984.9	25/1350	39				
NOAA Buoy 44009 (38.5°N 74.7°W)	25/0650	989.1	25/0750	37				
NOAA Buoy 44013 (42.4°N 70.7°W)	25/1650	993.8	25/1550	37				
NOAA Buoy 44017 (40.7°N 72.0°W)	25/1550	988.1	25/1250	41				
NOAA Buoy 44018 (41.3°N 69.3°W)	25/1350	987.4	25/1450	37				
NOAA Buoy 44025 (40.3°N 73.2°W)	25/1450	988.7	25/0950	39				
NOAA Buoy 44027 (44.3°N 67.3°W)	25/1750	997.5	25/1750	39				
NOAA Buoy 44034 (44.1°N 68.1°W)	25/1704	999.9	25/1704	35				
NOAA Buoy 44142 (42.5°N 64.0°W)	25/1700	992.4	25/1700	37				
Anclote Key (ANCF1) (28.2°N 82.8°W)			24/1054	37	47			
Big Carlos Pass (BGCF1) (26.4°N 81.9°W)	24/1054	969.2	24/1054	56	76			
Clearwater Beach			24/1400	41	48			

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
(CWBF1) (28.0°N 82.8°W)								
Cedar Key (CDRF1) (29.1°N 83.0°W)	24/1100	1003.2	24/1650	20	33			
Duck Pier (DUCN7) (36.2°N 75.7°W)	24/2200	998.4	24/2130	37				
Fowey Rocks (FWYF1) (25.6°N 80.1°W)	24/1243	975.3	24/1159	88	107			
Fort Myers (FMRF1) (26.7°N 81.9°W)			24/1242	46	62			
Fred Howard (COMPS FHP)			24/1154	39	49			
Homosassa (COMPS HOM)	24/1754	1001.0	24/1654	31				
Isle of Shoals (IOSN3) (43.0°N 70.6°W)	25/1600	995.4	25/1600	46				
Long Key (LONF1) (24.8°N 80.9°W)	24/1100	982.2	24/0930	57	76	4.0		
Mt Desert Rock MDRM1) (44.0° N 68.1°W)	25/1700	997.1	25/1700	49				
Matinicus Rock (MISM1) (43.8°N 68.9°W)	25/1700	997.1	25/1400	45				
Molasses Reef (MLRF1) (25.0°N 80.4°W)	24/1200	982.3	24/1220	66	81			
Port Richey (PTRF1) (28.3°N 82.7°W)			24/1654	25	37			
St. Augustine (SAUF1) (29.9°N 81.3°W)	24/2005	999.9	24/1440	35	44			
Settlement Point (SPGF1) (26.7°N 79.0°W)	24/1600	969.9	24/1600	83	103			
Sombrero Key (SMKF1) (24.6°N 81.1°W)	24/1000	983.4	24/0920	76	91	2.1		
Tyndall Tower (SGOF1) (29.4°N 84.9°W)	24/1100	1007.3	24/1400	40				
U.S. Navy Tower No. R8 (31.6°N 79.9°W, TYBG1)	24/2128	996.0	24/2128	35				
Venice (VENF1) (27.1°N 82.4°W)	24/1100	990.0	24/1500	44	55			
Woods Hole (BUZM3) (41.4°N 71.0°W)	25/1700	989.0	25/1300	48				
Unofficial Observations								
Florida								

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Apopka								9.35
Arcadia (FAWN)			24/1245	34	56			
Archbold			24/1322		64			6.07
Avalon COOP								3.25
Balm (FAWN)			24/1045	28	44			
Boynton Beach (26.6°N 80.1°W)	24/1400	954.5						
W Boynton Beach (KFLBOYNT4)	24/1358	953.2	24/1554	78	103			
Collier County EOC			24/1316		109			
Cudjoe Key			24/0913		107			
Deerfield Beach (26.3°N 80.1°W)	24/1400	956.2						
Doral CBS-4 TV			24/1149		99			
Dry Tortugas Nat'l Park			24/0515		116			
Duck Key					75			2.39
Everglades City Mark Suddath HLP Tower	24/0955	953.9			117			
Fort Pierce (FAWN)								6.09
Grant								5.99
Interstate 75 and Florida. Highway 80	24/1130	978.7		56	74			
John Pennekamp State Park								1.50
Kenansville COOP								5.64
Lake Alfred (FAWN)			24/1215	16	38			
Lake Wales RAWS (LWEF1)			24/1345	24	43			
Lantana (26.6°N 80.1°W)	24/1415	953.2						
Marco Island	24/1015	954.0			117			
Martin County F&R Hobe Sound MCFR1 (AWS)	24/1514	954.6						
Martin County EOC Stuart MCEOP (AWS)	24/1444	957.0						
Melbourne Beach								5.14
Melbourne F.I.T			24/1651		64			

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Miramar TV 6			24/1222		91			
Mountain Lake								6.00
Mulberry								6.93
Nettles Island COOP								0.08
North Port								5.67
North Port 2N								6.42
Okahumpka COOP								5.33
Ona (FAWN)			24/1800	20	46			
Orange Springs OSPF1								1.59
Palm Bay COOP			24/1602		60			
Palm Beach Gardens (26.8°N 80.3°W)	24/1415	951.8						
Palm Beach Gardens (26.9°N 80.2°W)	24/1445	953.5						
Palm Beach Jonathan Dickinson Missile Tracking Annex			24/1310	71	99			
Palm Coast WOGF1								3.95
Pembroke Pines	24/1300	960.0						
Pierson COOP								2.80
Pompano Beach			24/1248		104			
Ponce Inlet COOP								2.65
Port Salerno COOP								0.14
Punta Gorda 8 NE								7.57
Scottsmoor COOP								2.95
Sebring (FAWN)			24/1245	21	52			
South Fork St. Lucie River			UNK		116			
South Miami	24/1230	969.0						
Starke SRKF1								1.16
Stuart Skywarn Spotter (27.1°N 80.2°W)			24/1419		94			
Tamarac BSO BSO01 (AWC)	24/1314	955.6						
Titusville COOP								2.87
Umatilla COOP								4.29

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)			
Weston BSO DNBS2 (AWC)	24/1314	957.3						

[a] Date/time is for sustained wind when both sustained and gust are listed.
[b] Except as noted, sustained wind averaging periods for C-MAN and land-based ASOS reports are 2 min; buoy averaging periods are 8 min, and SFWMD observations are 15 min.
[c] Storm surge is water height above normal astronomical tide level.
[d] Storm tide is water height above National Geodetic Vertical Datum (1929 mean sea level).
[e] Instrumentation failed
[f] Incomplete or missing data

Table 4. Preliminary forecast evaluation (heterogeneous sample) for Hurricane Wilma, 15-25 October 2005. Forecast errors (n mi) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in bold-face type. Verification includes the depression stage, but does not include the extratropical stage.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	47 (38)	115 (36)	185 (34)	249 (32)	319 (28)	381 (24)	396 (20)
GFNI	40 (37)	79 (34)	122 (33)	172 (31)	258 (27)	366 (23)	463 (19)
GFDI	33 (39)	55 (37)	76 (35)	98 (33)	164 (29)	361 (25)	563 (21)
GFSI	32 (39)	52 (37)	65 (35)	84 (33)	**132 (29)**	265 (25)	429 (21)
AEMI	31 (39)	49 (37)	63 (35)	**81 (33)**	**126 (29)**	**240 (25)**	**328 (21)**
NGPI	35 (38)	69 (35)	104 (33)	139 (31)	218 (27)	339 (23)	441 (19)
UKMI	30 (37)	43 (35)	**57 (33)**	**77 (31)**	**113 (27)**	**240 (23)**	**340 (19)**
A98E	39 (38)	79 (36)	109 (34)	140 (32)	184 (28)	**243 (24)**	**380 (20)**
A9UK	39 (19)	77 (18)	107 (17)	140 (16)	199 (14)		
BAMD	49 (38)	88 (36)	115 (34)	132 (32)	197 (28)	379 (24)	533 (20)
BAMM	52 (38)	82 (36)	108 (34)	128 (32)	196 (28)	340 (24)	453 (20)
BAMS	73 (37)	124 (35)	165 (33)	192 (31)	231 (28)	332 (24)	414 (20)
CONU	29 (39)	48 (37)	71 (35)	96 (33)	150 (29)	271 (25)	**373 (21)**
GUNA	**26 (37)**	43 (35)	64 (33)	85 (31)	140 (27)	279 (23)	401 (19)
FSSE	**21 (33)**	**31 (31)**	**40 (29)**	**63 (27)**	142 (23)	308 (19)	480 (15)
OFCL	29 (39)	42 (37)	61 (35)	84 (33)	136 (29)	264 (25)	382 (21)
NHC Official (1995-2004 mean)	42 (3400)	75 (3116)	107 (2848)	138 (2575)	202 (2117)	236 (649)	310 (535)

Table 5. Watch and warning summary for Hurricane Wilma, 15-25 October 2005.

Date/Time (UTC)	Action	Location
16/0900	Hurricane Watch and Tropical Storm Warning Issued	Cayman Islands
17/1500	Tropical Storm Warning Issued	Honduras from the Honduras/ Nicaragua Border to Cabo Camaron
18/2100	Hurricane Watch Issued	Cuba from the Provinces of Matanzas westward through Pinar Del Rio and the Isle of Youth
18/2100	Hurricane Watch Issued	Mexico from Punta Allen to Cabo Catoche
19/0300	Hurricane Watch Issued	Mexico S of Punta Allen to Punta Gruesa
19/1500	Hurricane Watch changed to Hurricane Warning	Mexico from San Felipe to Tulum including Cozumel and nearby islands
19/1500	Tropical Storm Warning Issued	Mexico from S of Tulum to Chetumal
19/1500	Tropical Storm Warning Issued	Belize from the Border with Mexico to Belize City
19/1800	Hurricane Watch and Tropical Storm Warning Discontinued	Cayman Islands
20/0300	Hurricane Watch/Tropical Storm Warning changed to Hurricane Warning	Mexico from S of Tulum to Punta Allen
20/0300	Hurricane Watch Issued	Mexico from W of San Felipe to Celestun
20/0300	Tropical Storm Warning Issued	Cuba for the provinces of La Habana, Ciudad de la Habana, Pinar del Rio, and the Isle of Youth
20/0900	Tropical Storm Warning Issued	Mexico from W of San Felipe to Celestun
20/1500	Tropical Storm Warning changed to Hurricane Warning	Mexico from S of Punta Allen to Chetumal
21/0300	Tropical Storm Warning Discontinued	Honduras from the Honduras/ Nicaragua Border to Cabo Camaron
21/1500	Tropical Storm Warning Discontinued	Belize from the Border with Mexico to Belize City
22/1500	Hurricane Watch Issued	All of the Florida Keys including the Dry Tortugas and Florida Bay
22/2100	Hurricane Watch Issued	West coast of Florida from Longboat Key southward and the east coast of Florida from Titusville southward including Lake Okeechobee
22/2100	Hurricane Watch changed to Hurricane Warning	Cuban provinces of Ciudad de la Habana, La Habana, and Pinar del Rio

22/2100	Tropical Storm Watch Issued	Florida from N of Longboat Key to the Steinhatchee River and from north of Titusville to Fernandina Beach
23/0300	Hurricane Watch changed to Hurricane Warning	The Florida Keys including the Dry Tortugas and Florida Bay, the W coast of Florida from Longboat Key southward, the E coast of Florida from Jupiter Inlet southward including Lake Okeechobee
23/0300	Hurricane Watch Issued	NW Bahamas including the Abacos, Andros Island, Berry Islands, Bimini, Eleuthera, Grand Bahama Island, and New Providence
23/0600	Hurricane Warning Discontinued	Mexico from S of Punta Gresa to Punta Allen
23/0600	Hurricane Watch Discontinued	Mexico from W of San Felipe to Celestun
23/0600	Tropical Storm Warning Discontinued	Mexico from W of Progreso to Celestun
23/0900	Hurricane Watch changed to Hurricane Warning	Florida from N of Jupiter Inlet to Titusville
23/0900	Tropical Storm Watch changed to Tropical Storm Warning	Florida from N of Titusville to Flagler Beach
23/1200	Hurricane Warning Issued	NW Bahamas including the Abacos, Andros Island, Berry Islands, Bimini, Eleuthera, Grand Bahama Island, and New Providence
23/1500	Hurricane Warning changed to Tropical Storm Warning	Mexico from San Felipe to Punta Gresa
23/1500	Tropical Storm Warning Discontinued	Mexico from W of San Felipe to Progreso
23/2100	All Warnings Discontinued	Mexico
24/0300	Tropical Storm Watch changed to Tropical Storm Warning	Florida from N of Titusville to St. Augustine
24/1500	Tropical Storm Watch Discontinued	Florida from N of St. Augustine to Fernandina Beach
24/1700	Tropical Storm Warning Discontinued	Florida from N of Longboat Key to the Steinhatchee River
24/1830	Hurricane Warning changed to Tropical Storm Warning	The Florida Keys including the Dry Tortugas and Florida Bay, Florida W Coast from Longboat Key southward and Florida E Coast from S of Florida City including Lake Okeechobee
24/1830	Watches/Warnings Discontinued	Cuba
24/2100	Watches/Warnings Discontinued	Florida
24/2100	Warnings Discontinued	Bahamas

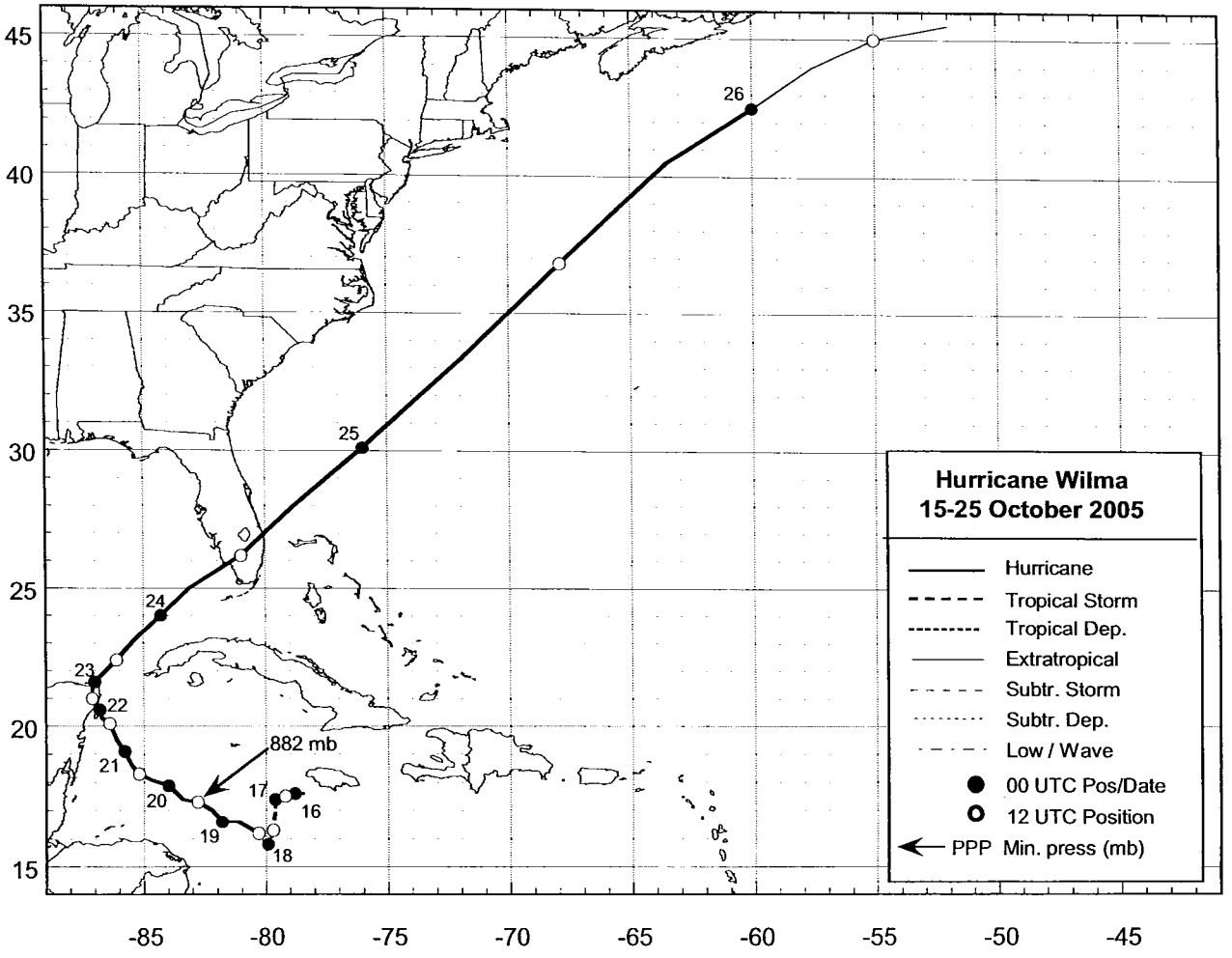

Figure 1. Best track positions for Hurricane Wilma, October 2005. Track during the extratropical stage is partially based on analyses from the NOAA Ocean Prediction Center.

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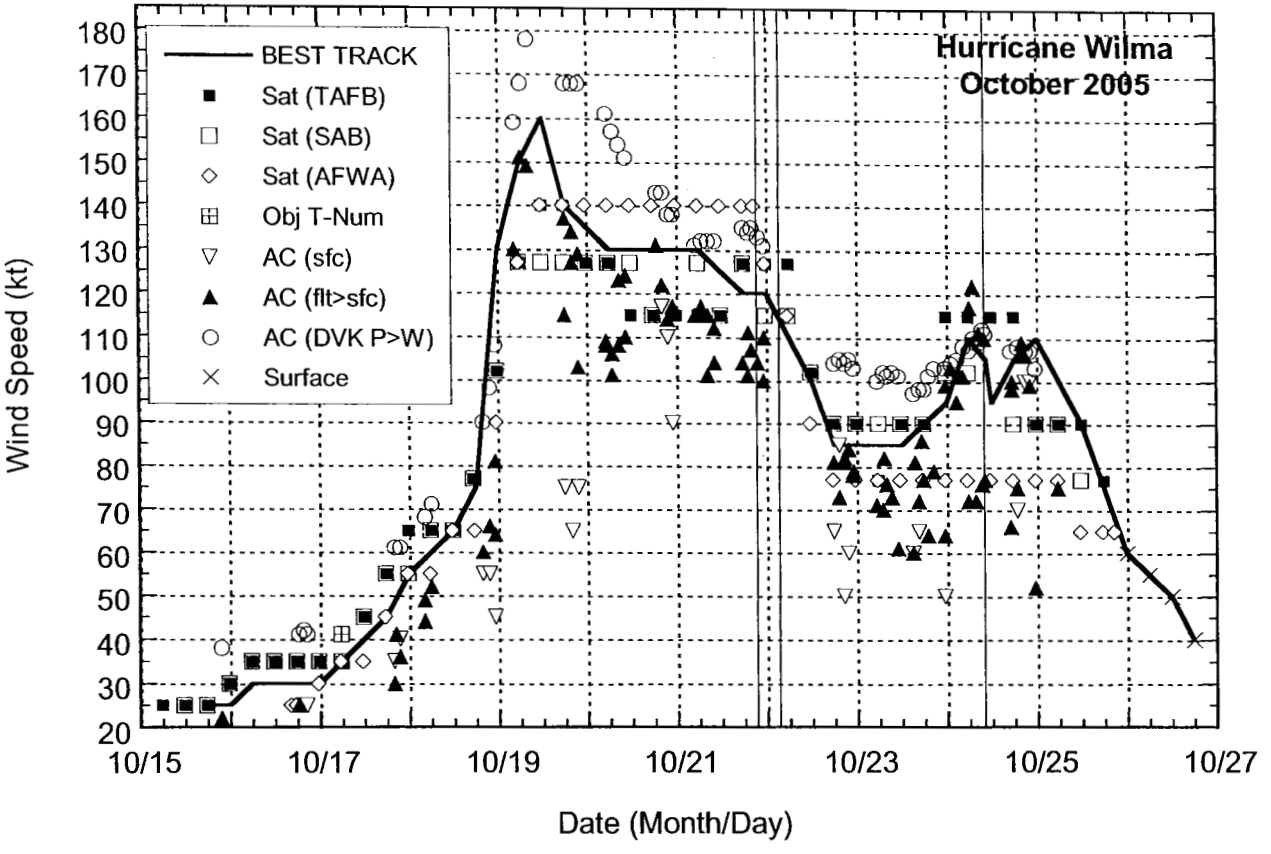

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Wilma, 15-25 October 2005. In most cases, aircraft observations have been adjusted for elevation using 90%, 80%, and 80% reduction factors for observations from 700 mb, 850 mb, and 1500 ft, respectively. Estimates during the extratropical stage are based partially on analyses from the NOAA Ocean Prediction Center. Vertical lines denote landfalls.

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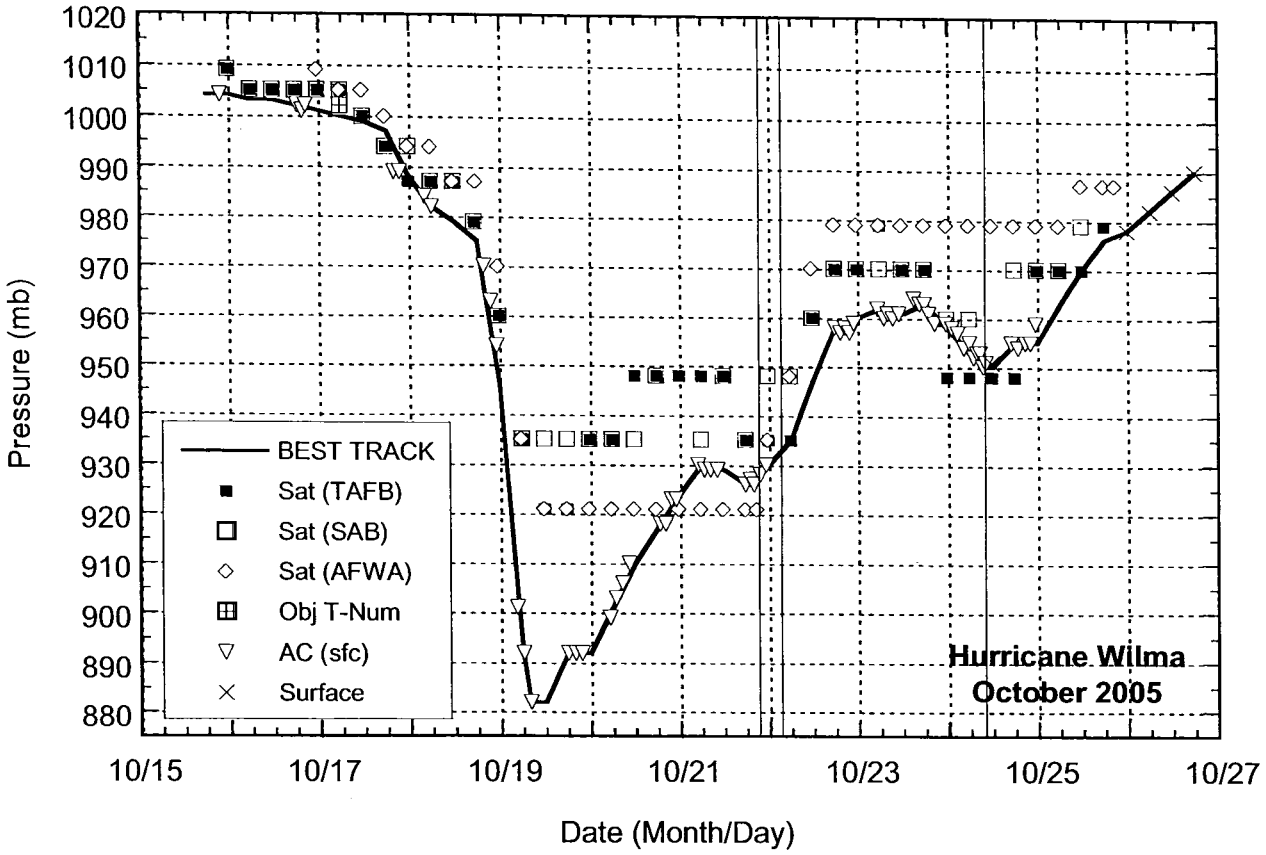

Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Wilma, 15-25 October 2005. Estimates during the extratropical stage are based partially on analyses from the NOAA Ocean Prediction Center. Vertical lines denote landfalls.

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Figure 4. Image of Wilma over South Florida at 1223 UTC from the Miami National Weather Service WSR-88D radar.

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BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan Filed pursuant to Rule 25-6.0342, F.A.C., Submitted by Tampa Electric Company.	)))))	DOCKET NO. 070297-EI FILED: AUGUST 30, 2007

TAMPA ELECTRIC COMPANY'S

ANSWERS TO FIRST SET OF INTERROGATORIES (NOS. 1 – 30)

OF

THE FLORIDA CABLE TELECOMMUNICATIONS ASSOCIATION, INC.

Tampa Electric files this its Answers to Interrogatories (Nos. 1 - 30) propounded and served on August 10, 2007, by The Florida Cable Telecommunications Association, Inc.

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070297-EI EXHIBIT 50
COMPANY FPL (Rebuttal)
WITNESS Regan Haines (FCTA)
DATE 10/02-03/07

TAMPA ELECTRIC COMPANY
DOCKET NO. 070297-EI
INDEX TO FCTA'S FIRST SET OF INTERROGATORIES (NOS. 1 – 30)

Number	Witness	Subject	Bates Stamped Page
1	Haines	Please identify and describe the amount of costs the Company will incur for implementing Storm Hardening that the Company will (a) seek to recover from cable operators in the form of increased annual pole attachment rental; and (b) seek to recover from cable operators in the form of direct reimbursements.	1
2	Haines	Please identify and describe the incremental cost difference for (a) make-ready engineering for new third party attachments, if any, due to Storm Hardening; and (b) make-ready work for new third party attachments, if any, due to Storm Hardening.	2
3	Haines	Will the Company require third party attachers to set a higher class pole than the replaced pole as a result of Storm Hardening? If so, describe in particularity the circumstances for such requirement, including, but not limited to whether the Company through the make-ready process for new attachments will require the cable operator to set a higher class pole than the replaced pole as a result of Storm Hardening.	3
4	Haines	If a pole is replaced or designated to be replaced as a result of Storm Hardening please identify and describe whether the Company will require the cable operator to replace the pole with (a) a pole exceeding the NESC strength and loading requirements; (b) a pole exceeding the standards for separation that applied to the replaced pole; or (c) a pole with a pole exceeding the NESC separation requirements. If the answer to (a), (b), or (c) is yes, please describe whether the Company will require the third party attacher to pay for the incremental cost associated with exceeding the standards that applied to the replaced pole or exceeding the NESC standards.	4
5	Haines	Please identify and describe the cost differentials for purchasing, setting, or otherwise performing make-ready for poles meeting (a) Grade C, (b) Grade B, and (c) extreme wind load standards.	5
6	Haines	Please identify and describe the amount by which each of the dollar amounts designated by the Company on the FERC Form 1 for each of the items in the listed accounts (as applicable) will be increased or decreased as a result of Storm hardening.	6

Number	Witness	Subject	Bates Stamped Page
7	Haines	Please identify the number of distribution poles the Company had at year end 2006 (a) in service and (b) in inventory, with the number of poles in each class and height.	8
8	Haines	Please identify how many distribution poles the Company estimates it will have at the end of years 2007, 2008 and 2009. Please identify the number of poles for each of those three years that exceed the number of poles at year end 2006 (a) that are attributable to the Company's Storm Hardening activities and (b) the percentage of such poles that will include third party attachments.	9
9	Haines	Please identify the number of poles the Company estimates it will replace in years 2007, 2008 and 2009 as a result of Storm Hardening and the percentage of such poles with third party attachments.	10
10	Haines	Please identify the number of Company poles carrying both transmission and distribution facilities. Please explain the criteria used by the Company to distinguish between "distribution" and "transmission" facilities.	11
11	Haines	Does the Company anticipate that the average utility pole height will increase as a result of Storm Hardening? If the answer is yes, please indicate by how much.	12
12	Haines	Does the Company anticipate that the average utility pole circumference and/or pole class will increase as a result of Storm Hardening? If the answer is yes, please indicate by how much and/or to what class.	13
13	Haines	Please confirm that in replacing poles or setting new poles as a result of the Storm Hardening that (a) any new pole installed by the Company will be of a class and height that is capable of accommodating the entities attached to adjacent poles; and (b) the Company will automatically license entities attached to adjacent poles, i.e., they will not have to file an application for attachment to the replaced or new pole.	14
14	Haines	In relocating poles with third party attachments and setting new poles in lines where adjacent poles have third party attachments, please identify and describe the process that the Company will undertake to ensure that relocation does not result in extraordinary cost increases for third party attachers.	15

Number	Witness	Subject	Bates Stamped Page
15	Haines	Please identify and describe any change to the Company's requirements for new third party attachments and overlashing, including any additional loading analysis being required, due to Storm Hardening. Will the same requirements be applicable to attachments made by the Company?	16
16	Haines	Will the Company permit a third party cable operator attacher to perform any required loading analysis (a) itself, or (b) using a third party contractor. If the answer is "no," will the Company perform the analysis using its own work force or hire a contractor? If a contractor will be used to perform any loading analysis of third party attachments required by the Company, which contractor will be used?	17
17	Haines	Please identify whether the Company has an contract in place for the performance of any required loading analysis of third party attachments. If the answer is "yes," what amount will the Company pay or has the Company agreed to pay to the contractor for the loading analysis? What amount, if any, will the Company charge the third party attacher for the loading analysis?	18
18	Haines	Please identify and describe the criteria that will be considered in any loading analysis required for third party attachments. Will the same criteria be used to assess the strength and loading impact of Company attachments? Will the same criteria be used to assess the strength and loading impact of all third party attachments?	19
19	Haines	What, if any, pole loading software will be used to perform the loading analysis required by the Company for new third party attachments and overlashing? What factors does such software to take into account in performing the loading determination?	20
20	Haines	Has the Company ever allowed cable operators to provide notice after the fact for any overlashing? If the answer is "yes," please identify and describe the conditions in which this has occurred (i.e., overlashing that does not increase the diameter of the existing attachment, overlashing in emergencies, overlashing that does not exceed a prescribed increase in load, etc.).	21

Number	Witness	Subject	Bates Stamped Page
21	Haines	Please identify and describe any and all actual examples of a Company pole failure that was caused by third party overlashing.	22
22	Haines	Please identify and describe the process by which the Company assesses responsibility for existing violations on poles that are being evaluated for new attachments or overlashing.	23
23	Haines	Please confirm whether the Company agrees or disagrees that the party that requires additional space or strength on a pole is the party responsible for any necessary make-ready engineering and construction, including the pole owner.	24
24	Haines	Please explain the nature of the audit of third party attachments that the Company is conducting in response to Initiative 2 of the Ten Point Initiative established in Docket 060198. For example, does the audit include a loading determination, an assessment of separation issues, a complete safety inspection, etc.?	26
25	Haines	Has the Company commenced the audit of third party attachments that the Company is conducting in response to Initiative 2 of the Ten Point Initiative established in Docket 060198? If so, what percentage of its plant has the Company audited to date? Please provide the results, to date, of any such audit.	27
26	Haines	With regard to the audit required by Initiative 2 of the Ten Point Initiative established in Docket 060198, please explain: (a) whether the Company intends to seek direct reimbursement from third party attachers for the audit; (b) how the Company intends to assign responsibility for any non-compliance with loading standards and, if applicable, separation standards, uncovered in the audit (i.e., if the attacher is licensed, explain whether it will be held responsible and under what basis); (c) whether the responsible party will be required to pay the full cost of correcting any non-compliance; and (d) if correction requires pole replacement, whether the responsible party will be required to replace the pole with a pole that exceeds NESC standards – strength and loading and/or separation. If the answer to (d) is yes, please explain what construction standard (Grade C, Grade B or extreme wind) will be applied and if the standard is a result of storm hardening.	28

Number	Witness	Subject	Bates Stamped Page
27	Haines	Please explain the process the Company has developed to allow third party attachers to have input concerning: the data being collected in the audit required by Initiative 2 of the Ten Point Initiative established in Docket 060198, the entity performing the audit, the cost of the audit, and the verification of audit results.	29
28	Haines	Is the Company conducting a complete NESC compliance safety inspection in conjunction with the pole inspections required by FPSC order PSC-06-0144-PAA-EI or any other Storm Hardening initiative?	30
29	Haines	Please identify and describe what the Company has done prior to the storm hardening initiatives to ensure that its utility pole plant is sound and meets NESC strength and loading standards and NESC separation requirements, or any standards adopted by the Company that exceed NESC.	31
30	Haines	Please identify any instances in which standards and processes being developed for Storm Hardening, including any analysis for strength and wind loading, will be applied differently to attachments made by the Company, cable operators and other third party attachers.	32

Regan Haines
Director, ED Engineering

Tampa Electric Company
702 N. Franklin Street
Tampa, Florida 33602

1. Please identify and describe the amount of costs the Company will incur for implementing Storm Hardening that the Company will (a) seek to recover from cable operators in the form of increased annual pole attachment rental; and (b) seek to recover from cable operators in the form of direct reimbursements.

A. (a) Tampa Electric can only provide an estimate to this question. As a sensitivity, a $1 million expenditure was added to the FERC account for poles. Also, estimates for book depreciation, federal income taxes, property taxes, gross plant investment, net plant at the end of year, accumulated depreciation, and accumulated deferred taxes were made and the number of poles was held constant, no retirements or new additions. Therefore, the estimate is skewed on the high side. The $1 million investment increased the annual pole attachment rate by approximately $0.06. Over time, this incremental cost would decrease. Assuming Tampa Electric's incrementally spending is approximately $18M annually on all storm Hardening initiatives, cable TV annual rental rates could increase up to $1.07.

(b) No incremental costs will be recovered from cable operators by direct reimbursement for all existing authorized or future new attachments due to improvements contemplated in Tampa Electric's Storm Hardening Plan. Direct reimbursements will be required for all unauthorized attachments for back rental charges and/or make-ready work needed to bring pole loading into compliance.

2. Please identify and describe the incremental cost difference for (a) make-ready engineering for new third party attachments, if any, due to Storm Hardening; and (b) make-ready work for new third party attachments, if any, due to Storm Hardening.

A. During the make-ready process, the company charges third party attachers for all engineering, construction labor, inspection, vehicle, and minor material costs associated with any new attachment application. The company does not charge third party attachers for major material assets such as poles and transformers that have to be replaced during the make-ready process. These costs are allocated to third party attachers through the pole attachment rental rates. There are no incremental changes to either make-ready engineering or work for new third party attachments due to storm hardening.

3. Will the Company require third party attachers to set a higher class pole than the replaced pole as a result of Storm Hardening? If so, describe in particularity the circumstances for such requirement, including, but not limited to whether the Company through the make-ready process for new attachments will require the cable operator to set a higher class pole than the replaced pole as a result of Storm Hardening.

A. All third party attachers are and have been required to ensure that all poles for which they are attached meet Tampa Electric's construction standards and loading requirements. The company's construction and loading standards have not changed and remain based on NESC Grade B criteria.

4. If a pole is replaced or designated to be replaced as a result of Storm Hardening please identify and describe whether the Company will require the cable operator to replace the pole with (a) a pole exceeding the NESC strength and loading requirements; (b) a pole exceeding the standards for separation that applied to the replaced pole; or (c) a pole with a pole exceeding the NESC separation requirements. If the answer to (a), (b), or (c) is yes, please describe whether the Company will require the third party attacher to pay for the incremental cost associated with exceeding the standards that applied to the replaced pole or exceeding the NESC standards.

A. For all existing authorized attachments, there will be no costs assigned to third party attachers for the replacement of an existing pole due to Tampa Electric's storm hardening activities as described in its Storm Hardening Plan. There may be cost responsibility and charges assigned to third party attachers for all unauthorized attachments for back rental charges and/or make-ready needed to bring a pole into compliance with the company's construction and loading standards. Again, this is not associated with the company's storm hardening activities and has been in place for years as part of Tampa Electric's contractual arrangements with its cable attachers.

5. Please identify and describe the cost differentials for purchasing, setting, or otherwise performing make-ready for poles meeting (a) Grade C, (b) Grade B, and (c) extreme wind load standards.

A. The company has no cost differential for purchasing, setting, or otherwise performing make-ready for poles meeting (a) Grade C, (b) Grade B, and (c) extreme wind load standards. The make-ready cost only includes engineering, construction labor, inspection, vehicle and minor material cost. These costs are virtually the same for (a) Grade C, (b) Grade B, and (c) extreme wind load standards.

6. Please identify and describe the amount by which each of the dollar amounts designated by the Company on the FERC Form 1 for each of the following items in the listed accounts (as applicable) will be increased or decreased as a result of Storm hardening:

a) Accumulated deferred income taxes - Total Plant (Account 190)
b) Accumulated deferred income taxes - Electric Plant (Account 190)
c) Accumulated deferred income taxes - Accelerated amortization property - Total Plant (Acct 281)
d) Accumulated deferred income taxes-Accelerated amortization property-Electric Plant (Acct 281)
e) Accumulated deferred income taxes - Other property - Total Plant (Account 282)
f) Accumulated deferred income taxes - Other property - Electric Plant (Account 282)
g) Accumulated deferred income taxes - Other - Total Plant (Account 283)
h) Accumulated deferred income taxes - Other - Electric Plant (Account 283)
i) Poles, towers and fixtures (Account 364)
j) Overhead conductors and devices (Account 365)
k) Services (Account 369)
l) Taxes other than income taxes (Account 408.1)
m) Income taxes – federal (Account 409.1 Federal)
n) Income taxes – other (Account 409.1 Other)
o) Provision for deferred income taxes (Account 410.1)
p) Provision for deferred income taxes – Credit (Account 411.1 Credit)
q) Investment tax credit adjustment (Account 411.4)
r) Maintenance of overhead lines (Account 593)
s) General Administrative expenses (Acc'ts 920-929, 930.1 & 930.2, 931)
t) Maintenance of General Plant (Account 935)
u) Plant in Service - Total Plant
v) Plant in Service - Electric Plant
w) Depreciation - Total Plant
x) Depreciation - Electric Plant
y) Depreciation Rate for Poles
z) Rate of return authorized for the utility for intrastate service
aa) Number of Poles Solely Owned
bb) Number of Poles Jointly Owned

cc) Percentage Ownership in Poles Jointly Owned

A. Tampa Electric maintains records in accordance with FERC and the uniform system of accounts. The company does not separate the reason for the replacement or addition of a pole such as maintenance, storm hardening or due to customer growth. Therefore, the exact dollar amount in each category cannot be determined. Generally, as capital expenditures are increased, it would be expected that items a) to p) and u) to x) would increase.

7. Please identify the number of distribution poles the Company had at year end 2006 (a) in service and (b) in inventory, with the number of poles in each class and height.

A. See tables below.

In-Service Year End 2006 Distribution poles

Sum of WOOD	HEIGHT												TOTAL
CLASS	<30'	30	35	40	45	50	55	60	65	70	75	>75'	
POLES	304	72,660	56,647	117,243	51,645	2,732	510	216	178	120	120	117	302,492
1	3	14	125	74	112	1,448	326	73	102	79	86	61	2,503
2	4	30	53	190	4,658	997	133	128	68	38	26	16	6,342
3	1	41	102	277	729	140	28	10	5	0	0	3	1,336
4	28	1,033	27,045	115,653	46,102	143	23	4	1	3	6	40	190,081
5	14	720	702	860	22	4	0	0	0	0	0	0	2,321
6	253	70,822	28,621	187	23	0	0	1	1	0	0	0	99,908
H1	0	0	1	0	0	0	2	0	0	0	0	0	3
H2	0	0	0	2	0	0	0	0	0	0	0	0	2
TOTAL	304	72,660	56,649	117,243	51,645	2,732	512	216	178	120	118	120	302,497

Poles in inventory at year end 2006

POLE TYPE - SHORT DESCRIPTION	# POLES
POLE, WOOD 30 FT CLASS 6 CCA TREATED NO CUT GAIN	522
POLE, WOOD,30 FT CLASS 6 PENTA TREATED, NO CUT GAIN	13
POLE, WOOD, 35 FT, CLASS 4, CCA TREATED.	256
POLE, WOOD 35 FT CLASS 4 PENTA TREATED	7
POLE, WOOD, 35 FT, CLASS 6, CCA TREATED NO CUT GAIN	395
POLE, WOOD,35 FT CLASS 6 PENTA TREATED, NO CUT GAIN.	8
POLE, WOOD, 40FT CLASS 2, CCA TREATED	0
POLE, WOOD, 40 FT CLASS 4, CCA TREATED.	168
POLE, WOOD 40 FT CLASS 4 PENTA TREATED	12
POLE, WOOD, 45 FT CLASS 2, CCA TREATED.	355
POLE, WOOD, 45 FT, CLASS 2, PENTA TREATED ONLY PER TEMS 6.01	0
POLE, WOOD, 45FT CLASS 3, CCA TREATED	0
POLE, WOOD, 45 FT CLASS 4, CCA TREATED.	179
POLE, WOOD, SOUTHERN YELLOW PINE, 50', CL1, CCA	93
POLE, WOOD SOUTHERN YELLOW PINE, LENGTH 55' CL1, CCA	14

8. Please identify how many distribution poles the Company estimates it will have at the end of years 2007, 2008 and 2009. Please identify the number of poles for each of those three years that exceed the number of poles at year end 2006 (a) that are attributable to the Company's Storm Hardening activities and (b) the percentage of such poles that will include third party attachments.

A. The company plans to have approximately 303,104 at the end of 2007, 303,711 at the end of 2008, and 304,317 by the end of 2009.

(a) The company estimates that very few incremental poles will be added as a result of its storm hardening activities. Tampa Electric's service area is fairly urban and the company's experience shows that overloaded poles are corrected by means other than adding additional mid-span poles. A majority of the poles projected to be added each year through 2009 will occur due to customer growth and the need to expand the company's distribution infrastructure to serve new customers or increasing demand. Again, the company does not consider changing poles out to meet Grade B construction standards as related to storm hardening as the company's construction and loading standards have not changed.

(b) The company estimates that very few incremental poles will be added as a result of its storm hardening activities therefore the percentage of such poles is inconsequential.

9. Please identify the number of poles the Company estimates it will replace in years 2007, 2008 and 2009 as a result of Storm Hardening and the percentage of such poles with third party attachments.

A. Based on distribution wood pole failure rates established since the implementation of the company's eight-year wood pole inspection program, it is estimated that approximately 2,470 poles will be replaced annually. Assuming an average of 66 percent of the company's poles has a joint attacher; approximately 1,630 poles will have third party attachments.

10. Please identify the number of Company poles carrying both transmission and distribution facilities. Please explain the criteria used by the Company to distinguish between "distribution" and "transmission" facilities.

A. Based on the most recent pole audit conducted by Tampa Electric, it is estimated that 60 percent of the company's 26,000 transmission poles have distribution lines attached to them. Therefore, approximately 15,600 Tampa Electric poles carry both transmission and distribution facilities.

Transmission facilities are defined as electric facilities operating at 69 kV or above while distribution facilities are defined as electric facilities operating below 69 kV.

11. Does the Company anticipate that the average utility pole height will increase as a result of Storm Hardening? If the answer is yes, please indicate by how much.

A. Tampa Electric does not anticipate the average pole height to increase because of storm hardening.

12. Does the Company anticipate that the average utility pole circumference and/or pole class will increase as a result of Storm Hardening? If the answer is yes, please indicate by how much and/or to what class.

A. The company does anticipate its average pole circumference and/or pole class to increase slightly due to increased pole inspections, the requirement to perform loading analysis on all joint use poles, and the utilization of PoleForeman loading analysis software. Based on recently inspected poles and analyzed data, some have been replaced with a one to two class stronger pole. However, in some cases the comprehensive loading analysis revealed that a smaller circumference pole could be used and still remain in compliance with Grade B construction.

13. Please confirm that in replacing poles or setting new poles as a result of the Storm Hardening that (a) any new pole installed by the Company will be of a class and height that is capable of accommodating the entities attached to adjacent poles; and (b) the Company will automatically license entities attached to adjacent poles, i.e., they will not have to file an application for attachment to the replaced or new pole.

A. (a) Whenever the company engineers the replacement of an existing pole or the installation of a new mid span pole, all existing authorized third party attachments will be accommodated and at no make-ready or engineering cost to the third party attacher.

(b) Whenever the company installs a new mid span pole where there exists an authorized third party attachment(s) on adjacent poles, the company will automatically license the attachment(s) on the new pole.

14. In relocating poles with third party attachments and setting new poles in lines where adjacent poles have third party attachments, please identify and describe the process that the Company will undertake to ensure that relocation does not result in extraordinary cost increases for third party attachers.

A. During the design phase of a job involving a relocated pole, the company will send any affected third party attacher advanced notice of the job along with a sketch via the National Joint Utility Notification System. If a third party attacher will be impacted by extraordinary costs, the third party attacher may request a meeting with the company's representative to discuss alternatives that may be feasible.

15. Please identify and describe any change to the Company's requirements for new third party attachments and overlashing, including any additional loading analysis being required, due to Storm Hardening. Will the same requirements be applicable to attachments made by the Company?

A. There are no changes to requirements for new third party attachments due to storm hardening. All of the company's pole attachment agreements require that the attaching party receive approval prior to making any new attachment to the company's poles. The company's attachment procedures have been in affect for several years, and are adapted to certain attaching parties when contract terms override the company's attachment procedures. The same requirements are applicable to attachments made by the company.

16. Will the Company permit a third party cable operator attacher to perform any required loading analysis (a) itself, or (b) using a third party contractor. If the answer is "no," will the Company perform the analysis using its own work force or hire a contractor? If a contractor will be used to perform any loading analysis of third party attachments required by the Company, which contractor will be used?

A. Tampa Electric does not anticipate allowing third party attachers to perform the required loading analysis. The company utilizes both company and contract personnel to perform loading analysis. Various contractors have been used in the past and the company cannot predict which ones will be used in the future.

17. Please identify whether the Company has an contract in place for the performance of any required loading analysis of third party attachments. If the answer is "yes," what amount will the Company pay or has the Company agreed to pay to the contractor for the loading analysis? What amount, if any, will the Company charge the third party attacher for the loading analysis?

A. The company has a contract in place with Innovative Joint Utility Services, LLC to perform make-ready engineering which includes loading analysis. The contractor rates are contractual and privileged. The third party attacher making the request will pay all of the applicable make-ready costs including engineering, construction labor, inspection, vehicle, and loading analysis expenses incurred by Tampa Electric.

18. Please identify and describe the criteria that will be considered in any loading analysis required for third party attachments. Will the same criteria be used to assess the strength and loading impact of Company attachments? Will the same criteria be used to assess the strength and loading impact of all third party attachments?

A. All poles on the company's distribution system will be evaluated using NESC Grade B criteria when pole loading analysis is performed for all company and third party attachments.

19. What, if any, pole loading software will be used to perform the loading analysis required by the Company for new third party attachments and overlashing? What factors does such software to take into account in performing the loading determination?

A. Several loading analysis software applications are used by the company and its contractors. All of the results are benchmarked against the main application used by the company, PoleForeman. Tampa Electric implemented PoleForeman in February 2007. PoleForeman is a Microsoft Windows based software package for use by Field Engineering Technicians designing and maintaining overhead distribution lines. PoleForeman provides an efficient and accurate method for classing wood utility poles and sizing guy strands to meet the requirements of the NESC and company's construction and loading standards.

The factors used to determine loading are:

- Pole length and class
- Setting depth
- Construction type (cross arm, triangular, vertical etc)
- NESC loading district/construction grade
- Equipment selection (transformer, capacitors, reclosers etc)
- Primary conductor, size, type, span length and tension
- Ruling span
- Number of phases
- Neutral conductor size, type, span length and tension
- Secondary conductor size, type, span length and tension
- Joint use conductor size, type, span length and tension
- Guy strands size, type, length and angle
- Anchor type and size

20. Has the Company ever allowed cable operators to provide notice after the fact for any overlashing? If the answer is "yes," please identify and describe the conditions in which this has occurred (i.e., overlashing that does not increase the diameter of the existing attachment, overlashing in emergencies, overlashing that does not exceed a prescribed increase in load, etc.).

A. The requirement of a third party attacher to notify and receive approval prior to overlashing is not a new requirement. It is a contractual obligation of those third party cable attachers who wish to attach any new facilities, including overlashing. Third party attachers have the obligation to ensure that their facilities do not violate Tampa Electric's construction standards. The standard is that nothing should be placed on a pole that is not engineered to be there. The company has allowed cable operators to provide notice after the fact for overlashing in the past under the premise that the last admitted and known attacher to the poles in question is accepting responsibility for any violation of the company's construction and loading standards that are found on the poles during the inspection of the attacher's application. However, the amount of overlashing has continued to increase in Tampa Electric's service territory introducing more load on each pole and increasing the potential for overloaded pole conditions. To mitigate this risk, the company is taking a proactive approach to managing its infrastructure. It is reasonable to expect notification by third party attachers when they are placing additional load on our facilities. It is also reasonable to expect that the company facility in question has been evaluated to ensure it is strong enough to accommodate the third party attachment.

21. Please identify and describe any and all actual examples of a Company pole failure that was caused by third party overlashing.

A. There is no root cause analysis process currently in place to review pole failures during normal operations. The data collection and forensic analysis process put in place as a result of storm hardening will allow the company to identify and analyze these situations following a major storm event.

22. Please identify and describe the process by which the Company assesses responsibility for existing violations on poles that are being evaluated for new attachments or overlashing.

A. The company performs a pole loading analysis each time a new attachment request, including overlashing, is made. In the case where existing violations are identified, the pole loading analysis provides the percent utilization of each attaching party. It is always assumed that the company was the first attacher. If it is determined that the company's attachments overloaded the pole, the company takes responsibility. If the company's attachments did not overload the pole, then the next likely attacher is evaluated. If that attacher overloaded the pole, then they are assessed with correcting the overload. If they did not cause the overload, then the next likely attacher is evaluated and so on and so forth. Where there is a dispute, the company and the third party attachers attempt to prove when their respective attachments were made to the overloaded pole. Where the third party attacher is not able to provide an approved application to attach by the company, and likewise, the company is not able to find an approved application to attach, it is assumed the attaching party assessed with the overload did not have an authorized attachment and as such, is responsible to pay for the make-ready that will bring the pole back into compliance or that the attaching party will remove their attachments to bring the pole back into compliance.

23. Please confirm whether the Company agrees or disagrees that the party that requires additional space or strength on a pole is the party responsible for any necessary make-ready engineering and construction, including the pole owner.

A. Tampa Electric disagrees in part and agrees in part. According to the FCC's Order on Reconsideration released on October, 26, 1999, the following rule addresses the company's position with respect to its need for additional space or strength on a pole.

> "9. Reservation of Space by Utility: In the Local Competition Order, we recognized that a balance needed to be struck between the non-discrimination principal of section 224(f), which prohibits a utility from favoring itself with respect to the provision of telecommunications and video services, and the need for a utility to be able to respond quickly to new circumstances affecting the provision of core utility service. Accordingly, we found that a utility may not reserve space for the provision of telecommunications or video service to the detriment of a would-be entrant to the telecommunications or video market. For example, an electric utility may not reserve space to provide telecommunications service and then force an attaching telecommunications provider to bear the cost of modifying the facility to increase capacity. An electric utility may, however, designate space as reserved for its core utility service. Such reservation must be consistent with a bona fide development plan that reasonably and specifically projects a need for that space for the provision of core electric service. A utility must also permit cable operators and telecommunications carriers to use the reserve space until the utility has an actual need for the space. At that time, the utility shall give the displaced cable operator or telecommunications carrier the opportunity to pay for the cost of any modifications needed to expand capacity and maintain the attachment."

Where a third-party attacher applies to attach to the company's poles, the company agrees that the third-party attacher is responsible for any

necessary make-ready engineering and construction costs as a result of the third party needing additional space or strength on a pole.

24. Please explain the nature of the audit of third party attachments that the Company is conducting in response to Initiative 2 of the Ten Point Initiative established in Docket 060198. For example, does the audit include a loading determination, an assessment of separation issues, a complete safety inspection, etc.?

A. Please see Sections 8.7 and 8.8 of the company's Storm Hardening Plan filed on May 7, 2007.

25. Has the Company commenced the audit of third party attachments that the Company is conducting in response to Initiative 2 of the Ten Point Initiative established in Docket 060198? If so, what percentage of its plant has the Company audited to date? Please provide the results, to date, of any such audit.

A. The company has initiated a pilot audit project of third party attachments on approximately 2,500 poles and is now performing a quality control check of the results. As discussed with the third party attachers prior to beginning the pilot project, once the company has accepted the results of this pilot project, it will share the results with the third party attachers to ensure agreement of the audit's scope and methodology. The company plans to audit approximately 25 percent of its system by year end.

26. With regard to the audit required by Initiative 2 of the Ten Point Initiative established in Docket 060198, please explain: (a) whether the Company intends to seek direct reimbursement from third party attachers for the audit; (b) how the Company intends to assign responsibility for any non-compliance with loading standards and, if applicable, separation standards, uncovered in the audit (i.e., if the attacher is licensed, explain whether it will be held responsible and under what basis); (c) whether the responsible party will be required to pay the full cost of correcting any non-compliance; and (d) if correction requires pole replacement, whether the responsible party will be required to replace the pole with a pole that exceeds NESC standards – strength and loading and/or separation. If the answer to (d) is yes, please explain what construction standard (Grade C, Grade B or extreme wind) will be applied and if the standard is a result of storm hardening.

A. (a) The company does intend to seek direct reimbursement from third party attachers for the audit. If all existing attachments have approved applications from the company, the company will mitigate any compliance issues at its own cost.

(b) Existing attachments that do not have approved applications from the company will be accessed cost responsibility for correcting any compliance issues. Direct cost allocation for all unlicensed attachers will be handled as described in Interrogatory No. 22.

(c) See response to Part (d) below.

(d) Existing attachments that do not have approved applications from the company will be accessed direct cost responsibility for correcting any compliance issues, including the applicable costs of replacing a pole. Cost allocation for all unlicensed attachers will be handled as described in Interrogatory No. 22. All attachers are required to ensure that their facilities meet the company's construction standards, which includes loading and separation requirements. The company's loading standards are based on NESC Grade B criteria and have not changed as a result of the storm hardening.

27. Please explain the process the Company has developed to allow third party attachers to have input concerning: the data being collected in the audit required by Initiative 2 of the Ten Point Initiative established in Docket 060198, the entity performing the audit, the cost of the audit, and the verification of audit results.

A. As described previously in Interrogatory No. 25, the company will allow third party attachers to have input concerning the data being collected and verification of the audit results.

28. Is the Company conducting a complete NESC compliance safety inspection in conjunction with the pole inspections required by FPSC order PSC-06-0144-PAA-EI or any other Storm Hardening initiative?

A. As stated and approved in Tampa Electric's Wood Pole Inspection Program, the company will conduct various NESC compliance safety inspections during each pole inspection.

29. Please identify and describe what the Company has done prior to the storm hardening initiatives to ensure that its utility pole plant is sound and meets NESC strength and loading standards and NESC separation requirements, or any standards adopted by the Company that exceed NESC.

A. The company has maintained its construction standards in a set a manuals entitled "General Rules and Specifications". These manuals are used by design and construction personnel to ensure that the distribution system is constructed and maintained in a manner that meets the NESC and company loading and separation requirements. In addition, prior to the storm hardening initiatives, the company performed pole inspections to ensure the pole plant was sound. This included visual inspections along with sound and bore, excavation and treatment on specific poles. Poles were not inspected if they were either less than 10 years old or chromated copper arsenate (CCA) poles less than 20 years old. The company also used OCalc pole loading analysis software from Osmose and an internally developed pole loading spreadsheet model to ensure poles met the company's loading standards based on NESC Grade B criteria. Outside contractors have also performed comprehensive loading analysis using LD Field pole loading analysis software from Itron.

30. Please identify any instances in which standards and processes being developed for Storm Hardening, including any analysis for strength and wind loading, will be applied differently to attachments made by the Company, cable operators and other third party attachers.

A. There are no differences in how strength loading analysis will be applied between Tampa Electric, cable operators or other third party attachers.

A F F I D A V I T

STATE OF FLORIDA)
)
COUNTY OF HILLSBOROUGH)

I hereby certify that on this 29th day of August, 2007, before me, an officer duly authorized in the State and County aforesaid to take acknowledgments, personally appeared Regan Haines, who is personally known to me, and he acknowledged before me that he provided the answers to interrogatory numbers 1 through 30 from FCTA'S FIRST SET OF INTERROGATORIES TO TAMPA ELECTRIC COMPANY (NOS. 1-30) in Docket No. 070297-EI, and that the responses are true and correct based on his personal knowledge.

In Witness Whereof, I have hereunto set my hand and seal in the State and County aforesaid as of this 29th day of August, 2007.

Notary Public
State of Florida, at Large

My Commission expires

Notary Public State of Florida
Brenda Lee Irizarry
My Commission DD551587
Expires 07/29/2010

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO._____ EXHIBIT #51 Not Entered
COMPANY _____
WITNESS _____
DATE _____

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Review of 2007 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, Florida Administrative Code, submitted by Florida Power and Light Company.	Docket No. 070301-EI Filed: October 2, 2007

ERRATA TO THE TESTIMONY OF MICHAEL T. HARRELSON

The Florida Cable Telecommunications Association, Inc. (FCTA) proffers this errata as an exhibit to correct references in Mr. Harrelson's testimony to his exhibits, which were subsequently renumbered for ease of reference at the request of Public Service Commission Staff. The following references in Mr. Harrelson's testimony should be corrected:

Testimony:

Page 6, line 1: Change MTH-2 to MTH-5

Page 6, line 3: Change MTH-3 to MTH-6

Page 6, line 5: Change MTH-4 to MTH-2

Page 6, line 7: Change MTH-5 to MTH-3

Page 17, line 1: Change MTH-4 to MTH-2

Page 27, line 3: Change MTH-2 to MTH-5

Page 27, line 15: Change MTH-2 to MTH-5

Page 32, line 20: Change MTH-3 to MTH-6

Page 43, line 16: Change MTH-2 to MTH-5

Page 46, line 17: Change MTH-5 to MTH-3

Exhibits:

Change MTH-2 to MTH-5

Change MTH-3 to MTH-6

Change MTH-4 to MTH-2

Change MTH-5 to MTH-3

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070298-EI EXHIBIT 52
COMPANY FPL (Rebuttal)
WITNESS Michael T. Harrelson (FCTA)
DATE 10/02-03/07

RESPECTFULLY SUBMITTED this 2nd day of October, 2007.

By: Maria T Browne

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Proposed Revisions to FPL's Rebuttal Testimony
To Reflect Withdrawal of Verizon Testimony
And partial Withdrawal of FCTA Witness Harrelson
Testimony Related to FPL in Docket No. 070301-EI

Consistent with the Commission's approval of withdrawing the testimony of Verizon Florida LLC witness Lawrence M. Slavin, the portion of the testimony of Verizon Florida LLC witness Sanford Walker related to FPL, and the portion of the testimony of FCTA witness Michael Harrelson related to FPL's third party attachment standard issues in the above docket, FPL revises the rebuttal testimony of its witness John J. McEvoy as follows:

- Page 3, lines 1-2. Delete "Verizon Florida LLC witness Lawrence M. Slavin and ...."

- Delete page 3, line 7 through 4, line 13.

- Delete page 7, lines 1-9.

- Page 10, lines 9-10. Delete the words "As is shown in Dr. Slavin's testimony in figure 1, ..."

- Delete page 10, line 19 through page 12, line 2.

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI **EXHIBIT** 53
COMPANY FPL (Rebuttal)
WITNESS Proposed Revisions to J. J. McEvoy's Testimony (FPL)
DATE 10/02 & 03/07

Proposed Revisions to FPL's Rebuttal Testimony to Reflect Withdrawal of Verizon Testimony and Partial Withdrawal of FCTA Witness Harrelson Testimony Related to FPL in Docket No. 070301-EI

Consistent with the Commission's approval of withdrawing the testimony of Verizon Florida LLC witness Lawrence M. Slavin, the portion of the testimony of Verizon Florida LLC witness Sanford Walker related to FPL, and the portion of the testimony of FCTA witness Michael Harrelson related to FPL's third party attachment standard issues in the above docket, FPL revises the rebuttal testimony of its witness Manuel B. Miranda as follows:

- Page 1, lines 20-21. Delete the words "Verizon Florida LLC by Lawrence M. Slavin and Sanford C. Walker as well as...."

- Page 2, lines 4-5. Delete the words "that FPL's attachment standards are not reasonably practicable as required by Rule 25-6.0342(5), F.A.C., ..."

- Page 9, line 1. Revise "Both Messrs. Harrelson and Walker suggest" to read "Mr. Harrelson suggests ...."

- Page 10, line 5. Delete "Verizon and ...."

- Page 10, line 7. Delete "Verizon and ...."

- Page 10, line 11. Delete "Verizon, ..."

- Page 11, line 1. Revise "Both Dr. Slavin and Mr. Harrelson suggest" to read "Mr. Harrelson suggests ...."

- Page 13, line 1. Revise "Mr. Harrelson and Dr. Slavin suggest" to read "Mr. Harrelson suggests ...."

- Delete page 14, lines 19 - page 16, line 15.

FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 070301-EI EXHIBIT 54
COMPANY FPL (Rebuttal)
WITNESS Proposed Revs. to M.B. Miranda's Testimony (FPL)
DATE 10/02-03/07