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GULF POWER
A SOUTHERN COMPANY

April 8, 2016

Ms. Carlotta Stauffer
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

RE: Rule 25-6.0143, F.A.C.; Undocketed

Dear Ms. Stauffer:

Attached is a revised version of Gulf Power Company's Hurricane Loss and Reserve Performance Analysis to replace in its entirety the document filed on January 15, 2016 as required per FPSC Rule 25-6.0143 - Use of Accumulated Provision Accounts 228.1, 228.2, and 228.4. This revised version corrects a keying error to the Reserve Fund Initial balance.

Sincerely,

Robert L. McGee, Jr.
Regulatory and Pricing Manager

md

Attachment

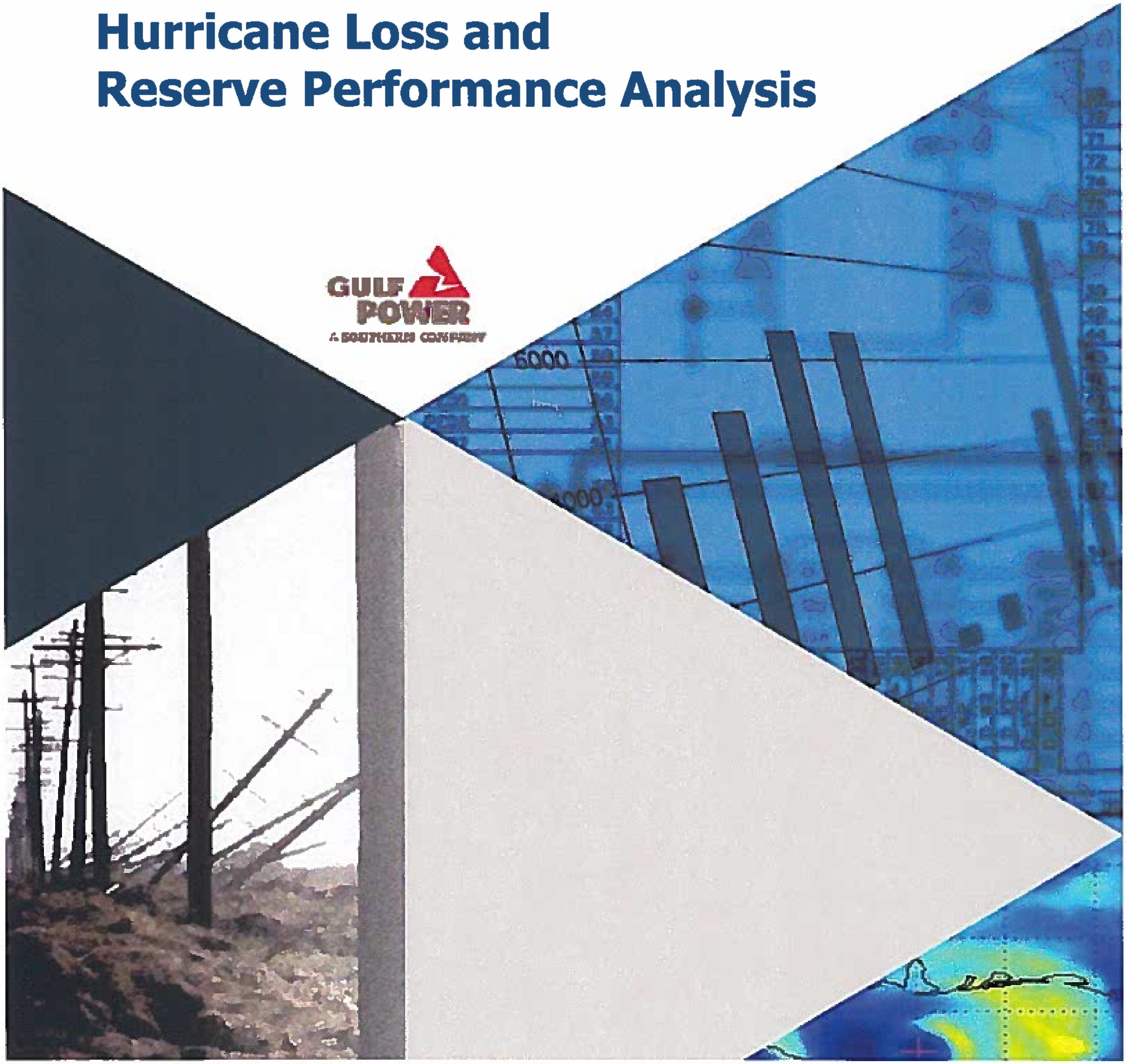
cc w/attach: Beggs & Lane
Jeffrey Stone

December 2015

CoreLogic

Gulf Power Company

Hurricane Loss and Reserve Performance Analysis



160186-OPC-POD-82-2

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Executive Summary

Gulf Power Company (Gulf) transmission and distribution (T&D) systems are exposed to and in the past have sustained damage from hurricanes. The exposure of these assets to hurricane damage is described and potential losses are quantified. Loss analyses were performed using computer catastrophe simulation models.

The hurricane exposure is analyzed from a probabilistic approach, which considers the full range of potential hurricane characteristics and corresponding losses. Factors considered in the analysis include the location of Gulf's T&D assets, the probability of hurricanes of different intensities and landfall points impacting those assets, the vulnerability of those assets to hurricane damage, and the costs to repair assets and restore electrical service.

The frequencies and computed damage for all simulated hurricanes are combined to calculate the expected annual loss and the annual aggregate exceedance relations. The expected annual damage represents the average of all storm years over a long period of time. There is a 10% probability that damage to T&D assets from all hurricanes in one year could exceed $20.3 million, and a 1% probability that damage could exceed $186 million.

An analysis was also performed to simulate the performance of Gulf's reserve fund over a five year prospective period. This probabilistic analysis is based on the losses and frequencies of occurrence of hurricanes and the current level of annual accruals to the reserve. This analysis shows the reserve fund balance is expected to decline from the current $35.7 million to $13.1 million at the end of five years. There is a 23.1% probability that the reserve could have inadequate funds to cover hurricane damage over the five year simulation period.

A summary of the analyses performed of Gulf's hurricane loss exposure and reserve performance are provided in the risk profile in Table E-1 below.

Table E-1

Gulf Power Company Transmission and Distribution Risk Profile

OWNER	**Gulf Power Company**	
ASSETS	Transmission and Distribution (T&D) System consisting of: Transmission towers, and conductors; Distribution poles, transformers, conductors, lighting and other miscellaneous assets	
LOCATION	All T&D assets located within State of Florida	
ASSET VALUE	Normal replacement value is approximately $ 2.3 billion, of which approximately 27% is transmission and 73% is distribution	
LOSS PERIL	Hurricane Windstorm (SSI 1 to 5)	
EXPECTED ANNUAL DAMAGE	$9.6 million	
10% AGGREGATE DAMAGE EXCEEDANCE VALUE	$20.3 million (one year)	
1% AGGREGATE DAMAGE EXCEEDANCE VALUE	$186 million (one year)	
	RESERVE PERFORMANCE	
Reserve Fund Initial Balance ($-million)	**Expected Fund Balance at 5 years ($-million)**	**Probability of negative balances within 5 years**
$35.7	$13.1	23.1%

1. Hurricane Loss Analysis

Gulf transmission and distribution (T&D) systems are exposed to and in the past have sustained damage from hurricanes. The exposure of these assets to hurricane damage is described and potential losses are quantified. Loss analyses were performed by CoreLogic, using a computer model simulation program *Risk, Quantification and Engineering (RQE®)* and the asset portfolio data provided by Gulf.

The hurricane exposure is analyzed from a probabilistic approach, which considers the full range of potential storm characteristics and corresponding losses. Probabilistic analyses identify the probability of damage exceeding a specific dollar amount. Damage to T&D assets is defined as the cost associated with repair and/or replacement of T&D assets necessary to promptly restore service in a post hurricane environment.

Probabilistic Annual Damage & Loss is computed using storms events in a 300,000-year simulation. Annual damage and loss estimates are developed for each individual site and aggregated to overall portfolio damage and loss amounts. Damage is defined as the cost associated with repair and/or replacement of T&D assets necessary to promptly restore service in a post-storm environment. This cost is typically larger than the costs associated with scheduled repair and replacement programs.

Factors considered in the analysis include locations of Gulf's overhead T&D assets, the probability of hurricanes of different intensities and/or landfall points impacting those assets, the vulnerability of those assets to hurricane damage, and the costs to repair assets and restore electrical service.

Transmission and Distribution asset data are provided in the Tables 1-1 and 1-2 below. Distribution and transmission asset values by zip code are shown in Figure 1-1 and Figure 1-2.

Table 1-1

Overhead Distribution Asset Replacement Values by County

County	Replacement Value ($K)
Escambia	590,565
Bay	308,774
Okaloosa	303,008
Santa Rosa	288,348
Washington	74,130
Walton	57,397
Holmes	24,010
Jackson	13,047
Total	**1,659,279**

Table 1-2

Overhead Transmission Asset Replacement Value by County

County	Replacement Value ($K)
Bay	119,169
Escambia	115,103
Okaloosa	102,617
Santa Rosa	87,237
Jackson	69,897
Walton	56,891
Calhoun	29,458
Washington	25,447
Holmes	11,369
Gadsden	6,153
Total	**623,341**

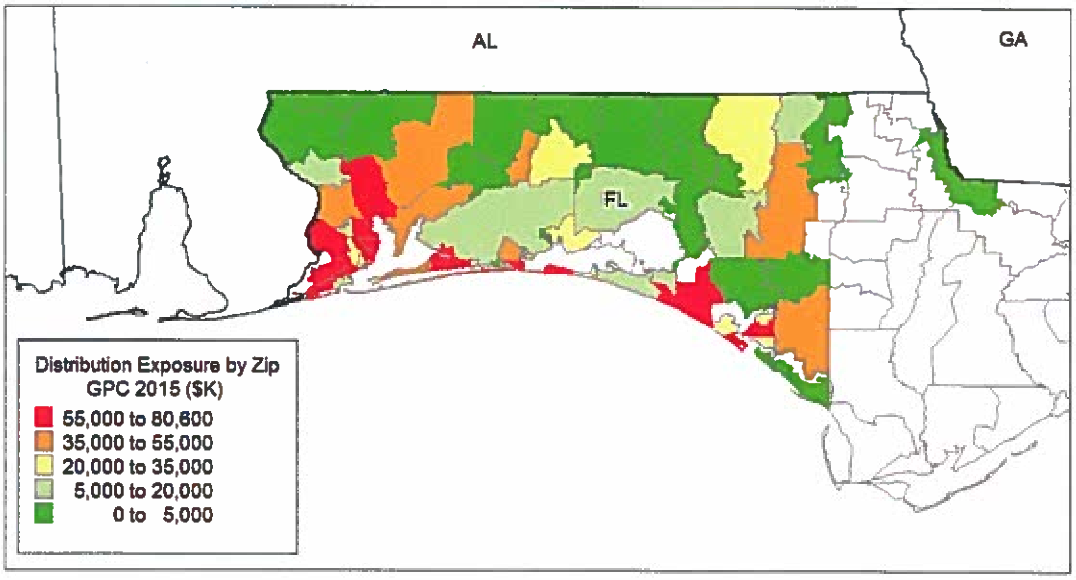

Figure 1-1: Overhead Distribution Asset Values by Zip Code

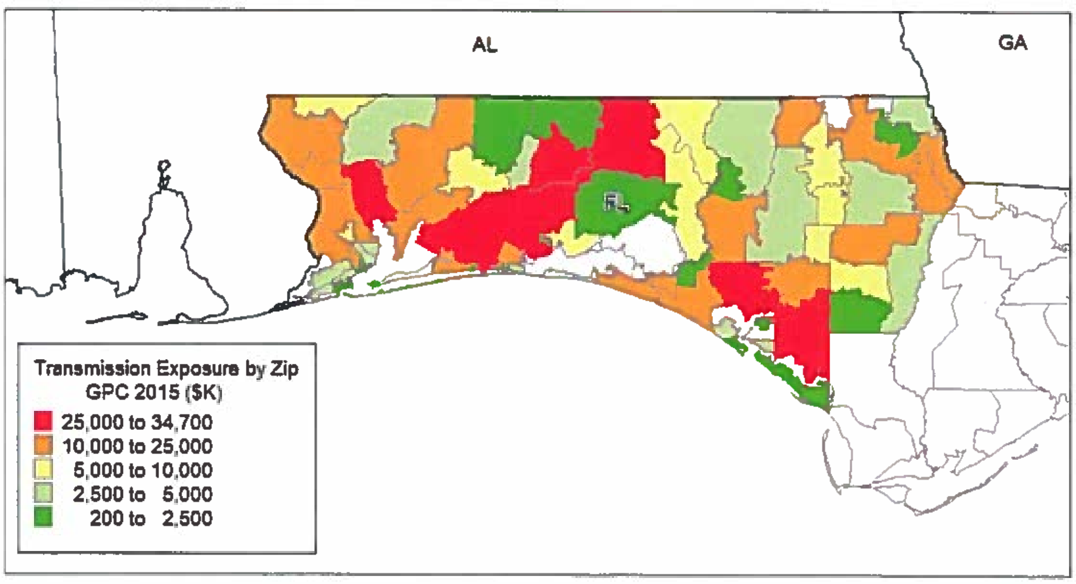

Figure 1-2: Transmission Asset Values by Zip Code

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Loss Estimation Methodology

The basic components of the hurricane risk analysis include:

- **Assets at risk:** define and locate
- **Hurricane hazard**: apply probabilistic storm model for the region
- **Asset vulnerabilities:** severity (wind speed) versus damage
- **Portfolio analysis:** probabilistic analysis - damage/loss

These analysis components are summarized herein.

2. Hurricane Hazard

The historical record for hurricanes on the Gulf and Atlantic coasts of the United States consists of approximately 112 years for which reasonably accurate information is available. For example, since 1900, there have been 68 hurricanes of Saffir-Simpson Intensity (SSI) 1 or greater (see Table 2-1 for description of the Saffir-Simpson Intensity scale) which have made landfall in the state of Florida. Going back further, written descriptions of storms are available, but it becomes increasingly difficult to estimate actual storm intensities and track locations in a reliable manner consistent with the later data. For this reason all hypothetical storms used in this analysis, as well as their corresponding frequencies, have been based only on hurricanes that have occurred since 1900.

Since the historical record is too sparse to simply extrapolate future hurricane landfall probabilities, a series of hypothetical storms was generated in the RQE probabilistic storm data base, essentially "filling in" the gaps in the historical data. This provides an estimate of future potential storm locations (landfall), track, severity and frequency consistent with the observed historical data.

The hurricane model was developed (Reference 1), using the National Oceanic and Atmospheric Administration (NOAA) model as the base, to determine individual risk wind speeds. The NOAA model was designed to model only a few specific types of storms. While the eye of the hurricane follows the selected track, the model uses up to a dozen different storm parameters to estimate wind speeds at all distances away from the eye. RQE is based in part on the Florida Commission on Hurricane Loss Projection Methodology's Official Storm Set, which includes hurricanes affecting Florida during the period 1900 through 2012.

The hurricane intensities used for the analyses conform to basic NOAA information regarding hurricane intensity recurrence relationships corresponding to locations along the coast. Much of Gulf's service area includes the coastal area where many of these hurricanes have made landfall.

The historical annual frequency of hurricanes has varied significantly over time. There are many causes for the temporal variability in hurricane formation. While stochastic variability is a significant factor, many scientists believe that the formation of hurricanes is also related to climate variability.

One of the primary climate cycles having a significant correlation with hurricane activity is the Atlantic Multidecadal Oscillation (AMO). It has been suggested that the formation of hurricanes in the Atlantic Ocean off the coast of Africa is related to the amount of rainfall in the Western African Sahel region. Years in which rainfall is heavy have been associated with the formation of a greater number of hurricanes. The AMO cycle consists of a warm phase, during which the tropical and sub-tropical North Atlantic basins have warmer than average temperatures at the surface and in the upper portion relevant to hurricane activity, and a cool phase, during which these regions of the ocean have cooler than average temperatures. In the period 1900 through 2012, the AMO has gone through the following phases:

1900 through 1925	Cool	(Decreased Hurricane Activity)
1926 through 1969	Warm	(Increased Hurricane Activity)
1970 through 1994	Cool	(Decreased Hurricane Activity)
1995 through 2012	Warm	(Increased Hurricane Activity)

These AMO phases are illustrated by the plot of Sea Surface Temperature (SST) Anomalies (deviation from the mean) in the Atlantic Basin over the past 150 years in Figure 2-1.

The National Oceanic and Atmospheric Administration (NOAA) believes that we entered a warm phase of AMO around 1995 which can be expected to continue for at least several years; historically, each phase of AMO has lasted approximately 25 to 40 years.

Probabilistic Annual Damage & Loss is computed using the results of thousands of random variable hurricanes considering the long term 112 year hurricane hazard.

Table 2-1

THE SAFFIR-SIMPSON INTENSITY SCALE
(NOTE THAT WINDSPEEDS GIVEN ARE 1-MINUTE SUSTAINED)

SSI	Central Pressure (mb)	Maximum Sustained Winds (mph)	Storm-Surge Height (ft)	Damage
1	≥ 980	74-95	4-5	Damage mainly to trees, shrubbery, and unanchored mobile homes
2	965-979	96-110	6-8	Some trees blown down; major damage to exposed mobile homes; some damage to roofs of buildings
3	945-964	111-130	9-12	Foliage removed from trees; large trees blown down; mobile homes destroyed; some structural damage to small buildings
4	920-944	131-155	13-18	All signs blown down; extensive damage to roofs, windows, and doors; complete destruction of mobile homes; flooding inland as far as 6 mi.; major damage to lower floors of structures near shore
5	< 920	> 155	> 18	Severe damage to windows and doors; extensive damage to roofs of homes and industrial buildings; small buildings overturned and blown away; major damage to lower floors of all structures less than 15 ft. above sea level within 500m of shore

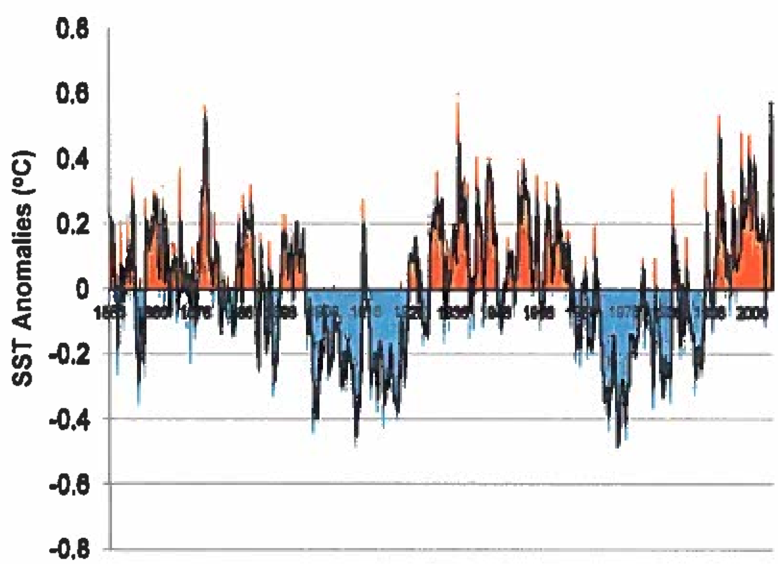

Figure 2-1: Atlantic Multidecadal Oscillation in Sea Surface Temperatures (SST) 1856-2010

3. Asset Vulnerabilities

Aerial T&D lines and structures have suffered damage in past hurricanes. Damage patterns tend to be most severe in coastal areas. Damage to inland aerial lines tends to be less severe with greater contributions to damage from wind-borne debris. The types of wind-borne debris can include tree and tree limbs, and roofing materials as well as structure debris at higher wind speeds.

Vulnerability of T&D assets are based upon modeled wind speeds and Gulf provided storm cost data from hurricanes since 2004. The Gulf loss history from the 2004 Hurricane Ivan, 2005 Hurricanes Dennis and Katrina provide data on recent hurricane recovery costs from moderate intensity events. The 2004-05 hurricane loss experience includes the effects of many factors including the post hurricane costs of labor, mutual aid and other factors associated with the hurricane restoration process utilized by Gulf. The 2004-05 loss history is believed to be most reflective of the current Gulf hurricane restoration practices and cost experience.

The Gulf Storm Hardening program has hardened portions of the transmission and distribution system assets and facilities. Estimated effects of the Storm Hardening program have also been considered in the vulnerability of the system T&D assets and losses.

4. Hurricane Landfall Analyses for SSI Ranges

In order to provide further insight into Gulf's risk profile, the full set of stochastic hurricane events were analyzed by landfall for four storm intensities, SSI 1 through 4. The landfall locations are at mile posts 790 through 1010. Figure 4-1 illustrates the landfall locations. These mile posts extend east from Pascagoula, MS to Apalachicola, FL at approximately 10 mile intervals.

The full set of stochastic storms within each SSI category was analyzed on Gulf's T&D portfolio. For each milepost and SSI category, the frequency-weighted average damage was computed from all stochastic storms making landfall within 10 nautical miles of a given milepost and within that SSI category. Figures 4-2 through 4-5 provide these results graphically.

Figure 4-1: Storm Landfall Mile Posts

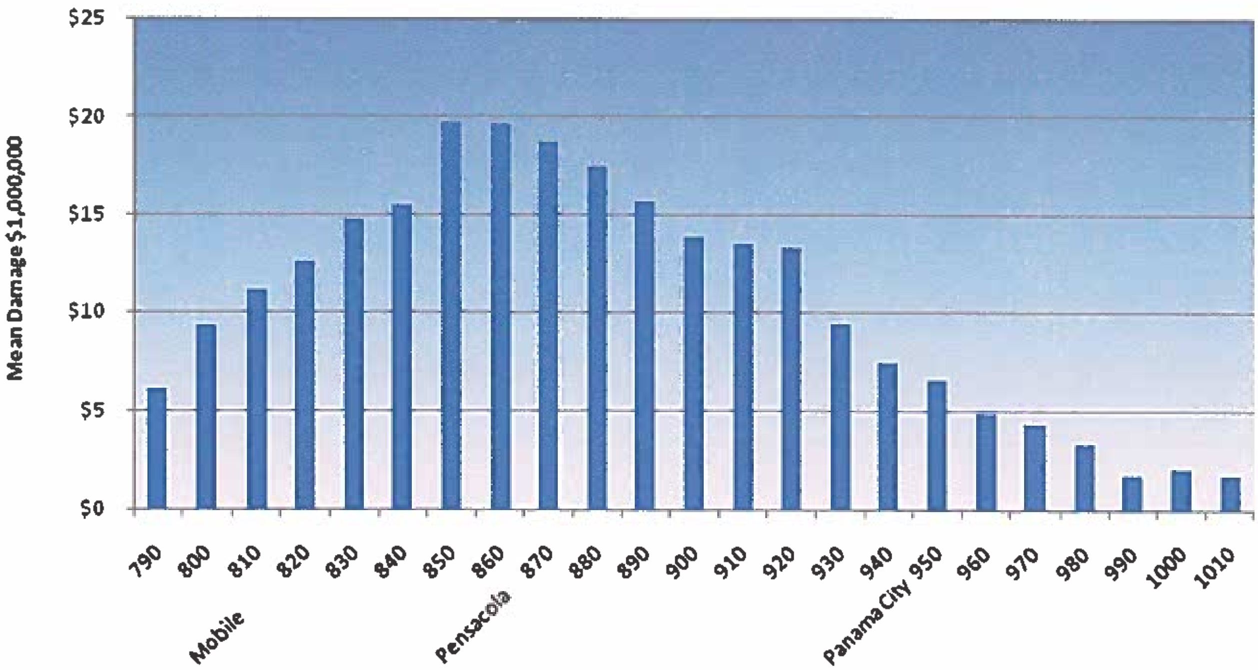

Figure 4-2: Frequency Weighted Average Transmission & Distribution Damage from SSI 1 Landfalls

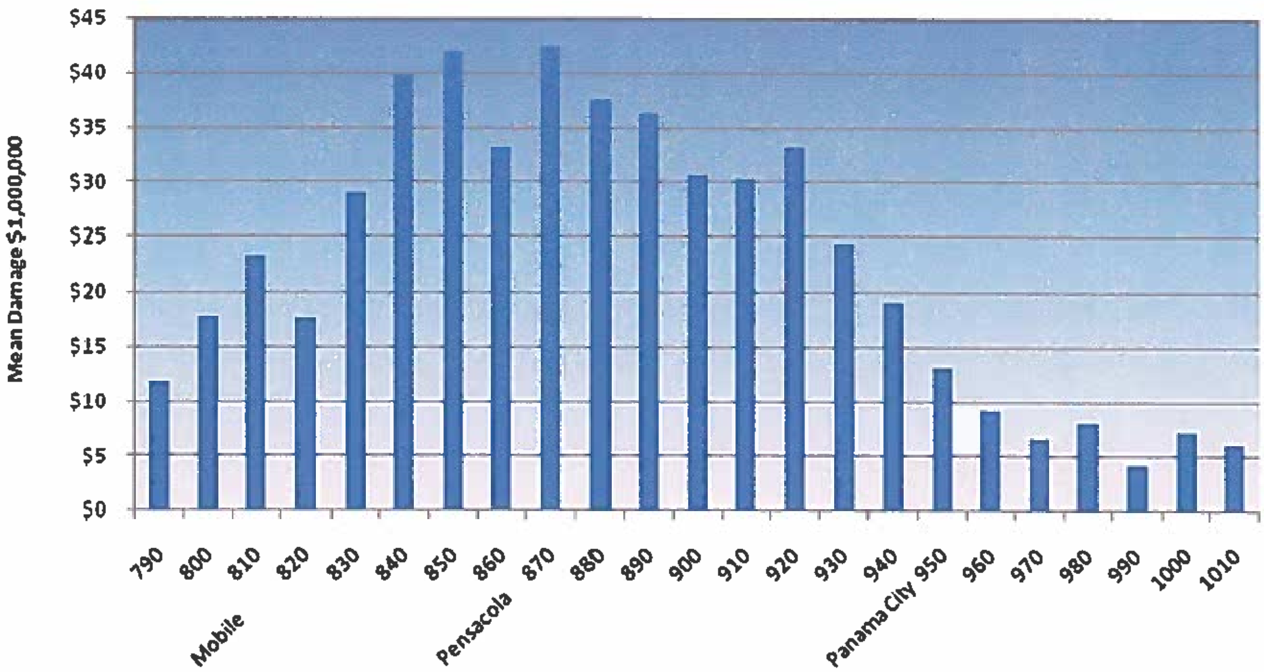

Figure 4-3: Frequency Weighted Average Transmission & Distribution Damage from SSI 2 Landfalls

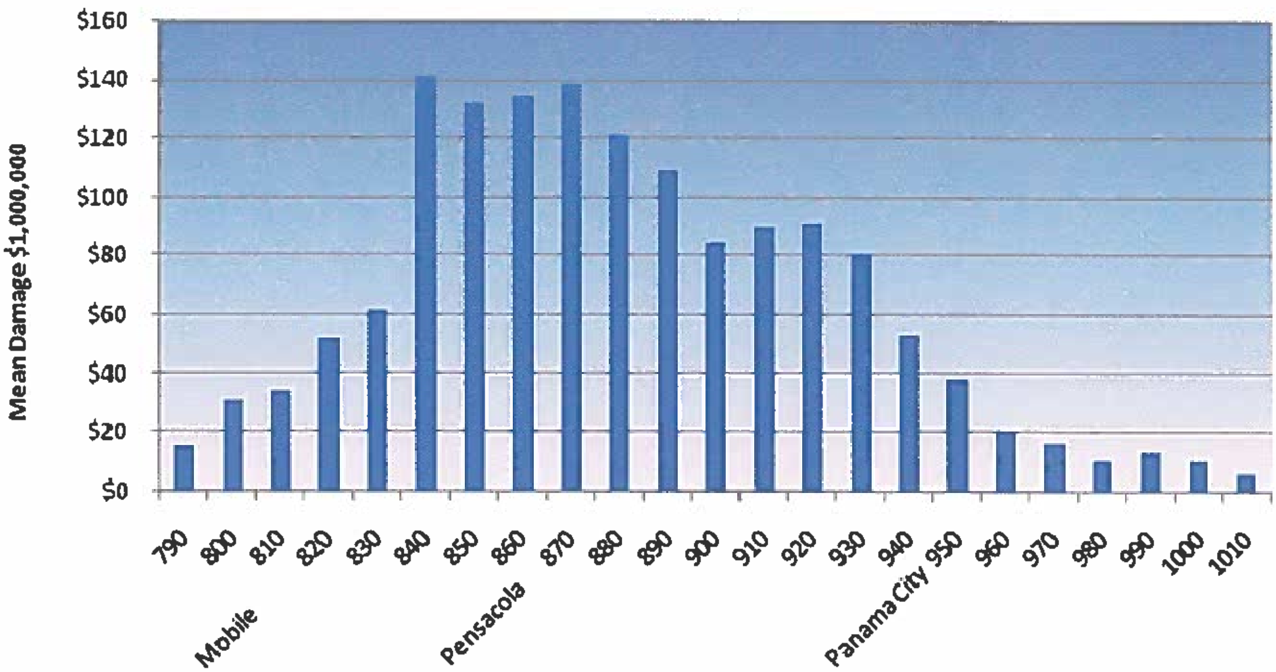

Figure 4-4: Frequency Weighted Average Transmission & Distribution Damage from SSI 3 Landfalls

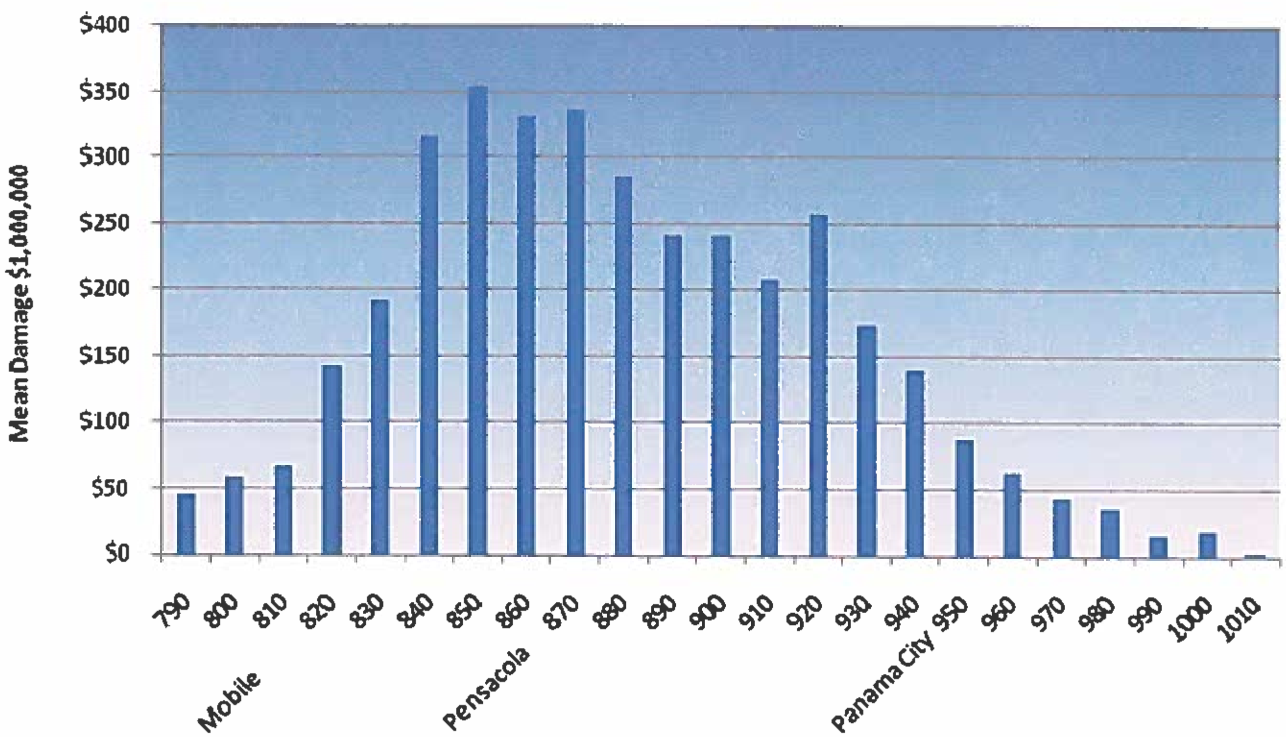

Figure 4-5: Frequency Weighted Average Transmission & Distribution Damage from SSI 4 Landfalls

5. Hurricane Loss Analysis Results

Gulf's portfolio of T&D assets was analyzed using the proprietary computer program, RQE subject to a suite of probabilistic hurricanes. The probabilistic storm analyses provide non-exceedance probabilities over a range of loss levels while the scenario landfall storm series provides a damage distribution for selected storms at landfalls within the areas of Gulf's highest asset concentrations.

Storm Probabilistic Analysis

The probabilistic loss analysis is performed using RQE. The hurricane hazard uses the RQE probabilistic database which models the coastline in 10 mile segments. The stochastic storm database has approximately 300,000-year simulations of possible hurricanes affecting the eastern United States, along both the Gulf and the Atlantic coasts. Each hurricane in the database has been defined by associating a central pressure with a unique storm track. In addition, each hurricane is assigned an annual frequency of occurrence, which depends on the storm track location and the storm intensity as measured by central pressure.

Aggregate Loss Exceedance and Expected Annual Loss

A probabilistic database of transmission and distribution losses is developed using the hurricane hazard, assets at risk and their vulnerabilities. For each hurricane, the center, shape, geographical orientation, track and wind speeds were defined. The wind field for each hurricane is integrated with the asset vulnerability and the asset locations to compute the damage. The annual frequency and the portfolio damage for each is simulated. By using this database of thousands of hurricane losses, various loss exceedance or non-exceedance distributions are generated.

The frequencies and computed damage for all hurricanes are combined to calculate the expected annual loss and the annual aggregate exceedance relationships.

Aggregate damage exceedance calculations are developed by keeping a running total of damage from ***all possible events*** in a year. At the end of year, the aggregate damage for all events is then determined by probabilistically summing the damage distribution from each event, taking into account the event frequency. The process considers the probability of having zero events, one event, two events, etc. during a year.

A series of probabilistic analyses were performed, using the vulnerability curves derived for Gulf's assets and the computer program RQE. A summary of the analysis is presented in Table 5-1, which shows the aggregate loss exceedance probability for damage layers between zero and over $180 million dollars.

For each damage layer shown, the probability of damage exceeding a specified value is shown. For example, the probabilities of losses exceeding $20 million in one year are 10.1%. The analysis calculates the probability of damage from all hurricanes and aggregates the total.

Table 5-1 provides the aggregate loss exceedance probabilities for the Gulf's T&D asset damage analyzed for a series of layers. Each layer has a layer amount of $10 million, except for the final layer which represents all damage $180 million and greater. The value in the first column, labeled Damage Layer, is the attachment point for each layer, with the exception of the last layer, for which the attachment point is $180 million.

The second column of the table, labeled 1 Year Exceedance Probability, provides the annual modeled probability of penetrating each layer, i.e. the probability that the total damage from all events in a 1 year period will exceed the attachment point of the layer.

The expected annual loss (EAL) and exposure to Gulf's Reserve from hurricane damage to transmission and distribution is $9.6 million. This value represents the average loss from all simulated hurricanes. The EAL is not expected to occur each and every year. Some years will have no damage from hurricanes, some years will have small amounts of damage and a few years will have large amounts of damage. The EAL represents the average of all hurricane years over a long period of time.

It should be noted that the National Oceanic and Atmospheric Administration (NOAA) believes that in 1995 we entered a period of heightened hurricane formation in the Atlantic Basin and near term frequencies of hurricanes over the coming decade should be expected to be significantly higher than those over the long term.

Table 5-1

GULF POWER COMPANY T&D ASSETS
AGGREGATE LOSS EXCEEDANCE PROBABILITIES

Damage Layer ($ x 1,000,000)	1 Year Exceedance Probability
> 0.5	25.2%
10	16.5%
20	10.1%
30	6.88%
40	5.40%
50	4.50%
60	3.86%
70	3.37%
80	2.99%
90	2.68%
100	2.41%
110	2.18%
120	1.97%
130	1.78%
140	1.60%
150	1.45%
160	1.31%
170	1.18%
180	1.07%

6. Reserve Performance Analysis

A probabilistic analysis of losses from hurricanes was performed for Gulf to determine their potential impact on the reserve fund.

The expected annual loss analyzed in the reserve performance is $7.9 million. The $7.9 million total reflects the historical portion of storm costs that have been charged to the reserve.

Analysis

The Reserve performance analysis consisted of performing 10,000 iterations of hurricane loss simulations within the Gulf service area, each covering a 5-year period, to determine the effect of the charges for damage on the Gulf Reserve. Monte Carlo simulations were used to generate damage samples for the analysis. The analysis provides an estimate of the Reserve assets in each year of the simulation, accounting for the annual accrual, expenses, fund earnings when balances are positive, borrowing costs when fund balances are negative and hurricane damage using a dynamic financial model.

Assumptions

The analysis performed included the following assumptions:

- An initial Reserve balance of $35.7 million.
- Annual Reserve accruals of $3.5 million were assumed in the analysis.
- Hurricane losses are assumed to increase by 3.68% per year as replacement values of T&D increase due to inflation, and system growth.
- Negative reserve balances are assumed to be financed with an unlimited line of credit costing 3.31%.
- Positive reserve balances are assumed to earn at an annual rate of 2.49%.
- $7.9 million of the $9.6 million Expected Annual Loss, determined in the Loss Analysis, is assumed to be an obligation of the reserve annually.
- All results are shown in constant 2014 reserve dollars.

The analysis results for the case analyzed are shown in Table 6-1 below. The results show the annual reserve accrual amount, the mean (expected) Reserve fund balance as well as the probability that the reserve fund balance will be negative in any one or more of the five years of the simulated time horizon.

Table 6-1
GULF POWER COMPANY T&D
RESERVE FUND ACCRUALS AND
PROBABILITY OF RESERVE FUND PERFORMANCE

Initial Reserve Balance ($ millions)	Annual Reserve Accrual ($ millions)	Expected Reserve Balance at end of 5 years ($ millions)	Probability of negative balance within 5 years (%)
$35.7	$3.5	$13.1	23.1%

Figure 6-1 below shows the results of the reserve fund performance analysis. These results show the mean (expected) reserve fund balance as well as the 5th and 95th percentiles.

For example, given an initial reserve balance of $35.7 million and an Annual Accrual of $3.5 million, Figure 6-1 illustrates the expected performance of the reserve. The reserve has a mean (expected) balance of about $13.1 million at the end of the five year period. The 5th percentile and 95th percentile 5 year ending reserve balances are $58.8 million and negative $(141) million respectively. The reserve has an 88% probability of having a balance greater than $35 million within the five year time interval. The reserve fund has a 23.1% chance of having a negative balance in one or more years of the five year simulation.

The first year of each simulation begins with a $35.7 million reserve balance. The first year's annual accrual will bring the reserve balance to about $40 million. The likelihood of hurricane damage exceeding $40 million in a single year is 5.4%, as shown in Table 5-1.

The accrual of $3.5 million is less than the reserve obligation of the Expected Annual Damage from hurricanes of $7.9 million. Therefore with each passing year, the reserve ending balance has a decreasing likelihood of accumulating surpluses. The expected (mean) reserve balance declines gradually over the five year simulation to $13.1 million at five years. This decline in the reserve balance reflects the difference between the smaller annual accrual compared to the larger expected annual damage. At the end of five years, the likelihood of annual hurricane damage in excess of $13.1 million is approximately 15%, about triple the likelihood at the beginning of the simulation.

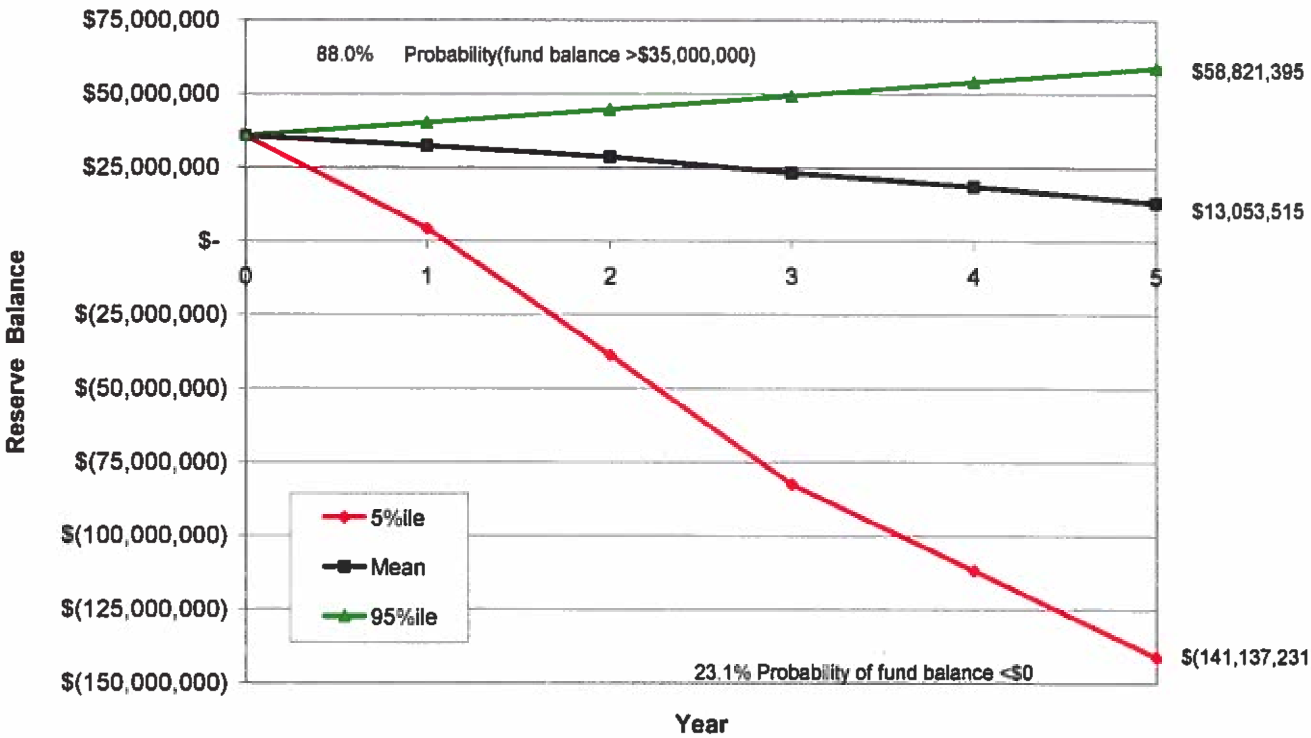

Figure 6-1: Reserve Performance Analysis Results: $35.7 million Initial Balance, $3.5 million Annual Accrual

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7. References

1. ""Florida Commission on Hurricane Loss Projection Methodology", CoreLogic-EQECAT, May 13, 2013.

About Core Logic

CoreLogic (NYSE: CLGX) is a leading global property information, analytics and data-enabled services provider. The company's combined data from public, contributory and proprietary sources includes over 3.5 billion records spanning more than 40 years, providing detailed coverage of property, mortgages and other encumbrances, consumer credit, tenancy, location, hazard risk and related performance information. The markets CoreLogic serves include real estate and mortgage finance, insurance, capital markets, and the public sector. CoreLogic delivers value to clients through unique data, analytics, workflow technology, advisory and managed services. Clients rely on CoreLogic to help identify and manage growth opportunities, improve performance and mitigate risk. Headquartered in Irvine, Calif., CoreLogic operates in North America, Western Europe and Asia Pacific. For more information, please visit www.corelogic.com.

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